January 7, 1952

1952 METALWORKING YEARBOOK ISSUE

STEEL

THE WEEKLY MAGAZINE OF METALWORKING

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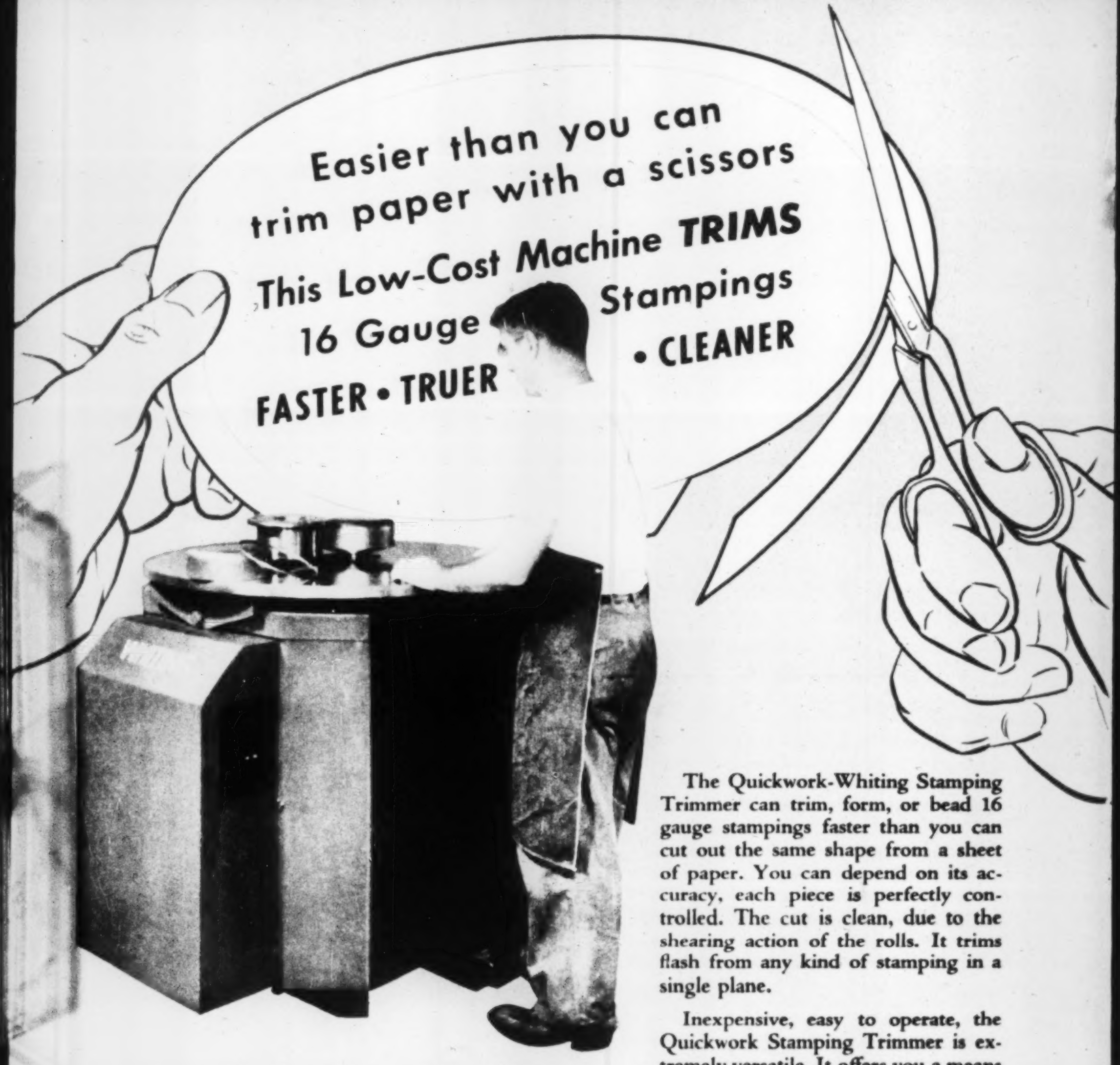
SHAPING INDUSTRY'S DESTINY

—*A Challenge to Management*

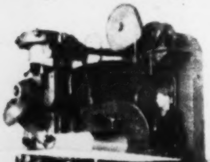


The Quickwork-Whiting Stamping Trimmer can trim, form, or bead 16 gauge stampings faster than you can cut out the same shape from a sheet of paper. You can depend on its accuracy, each piece is perfectly controlled. The cut is clean, due to the shearing action of the rolls. It trims flash from any kind of stamping in a single plane.

Inexpensive, easy to operate, the Quickwork Stamping Trimmer is extremely versatile. It offers you a means of expediting the finishing of almost any type of sheet metal stamping. It eliminates the need for expensive trimming dies, saves valuable press time. Write, today, for Bulletin QW-123.

New Techniques Possible

With special sets of rolls designed for special requirements, the Quickwork Stamping Trimmer multiplies its range of usefulness. Opens up new time and metal saving short-cuts in trimming, beading, and forming.



Takes the Place of 6 Machines

A Quickwork-Whiting Rotary Shear with attachments does the work of six machines. Fast—accurate—tested in service. Models available to handle up to 1" mild steel. Write for Bulletin QW-100R.

QUICKWORK DIVISION
WHITING*
CORPORATION
15643 Lathrop Avenue
HARVEY, ILLINOIS

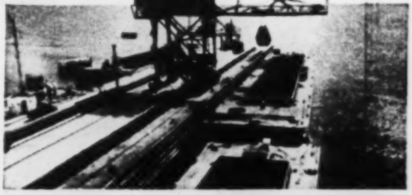
*Reg. U. S. Pat. Off.

Steel is on the march

...and here are some Bethlehem milestones of '51

▲ **BRIDGING CHESAPEAKE BAY.** Steelwork for the great new bridge linking Sandy Point and Kent Island, Md., is being fabricated and erected by Bethlehem. Much progress was made in 1951. The giant steel structure, 4.03 miles long, is to be part of an express highway between New York and Washington—a high-speed route that will completely bypass all cities.

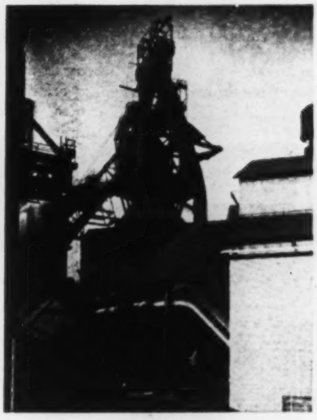
FIRST ORE FROM VENEZUELA. The first cargo of Venezuelan iron ore to ▶ reach this country arrived in March from Bethlehem's mines at El Pao. When full production is reached, these deposits are scheduled to yield about 3,000,000 tons annually; if necessary, this can be increased to 5,000,000 tons. The picture shown here was taken at Puerto de Hierro, where ore from the mines is stockpiled and later placed in seagoing vessels for the trip to the States.



MAKING STEELMAKING SAFER. Our plant at Bethlehem, Pa., again won first place among the country's large steel plants in the 1950–51 safety contest held by the National Safety Council. Second place went to our Johnstown, Pa., plant. Proving once more that safety is the result of careful planning, including group meetings such as the one shown here.

MORE CAPACITY. It is expected that Bethlehem's steel-producing capacity will reach 17,600,000 net tons by the end of 1952—an increase of 2,600,000 tons since January, 1950. Many facilities for other operations have also been added—as, for example, this 66-in. cold-reduction mill, which was placed in service during 1951.

FASTEST AMERICAN-BUILT LINERS. Constructed at Bethlehem's Quincy yard, the American ship *Independence* took to the seas in 1951. She now makes regular passenger runs between New York, France, and Italy. The *Independence* and a sister ship, the *Constitution* (also delivered by Bethlehem in 1951), are the fastest commercial vessels ever built in this country and have outstandingly fine appointments for passenger comfort. If need arises, both can be converted to transports carrying 5,000 troops each.

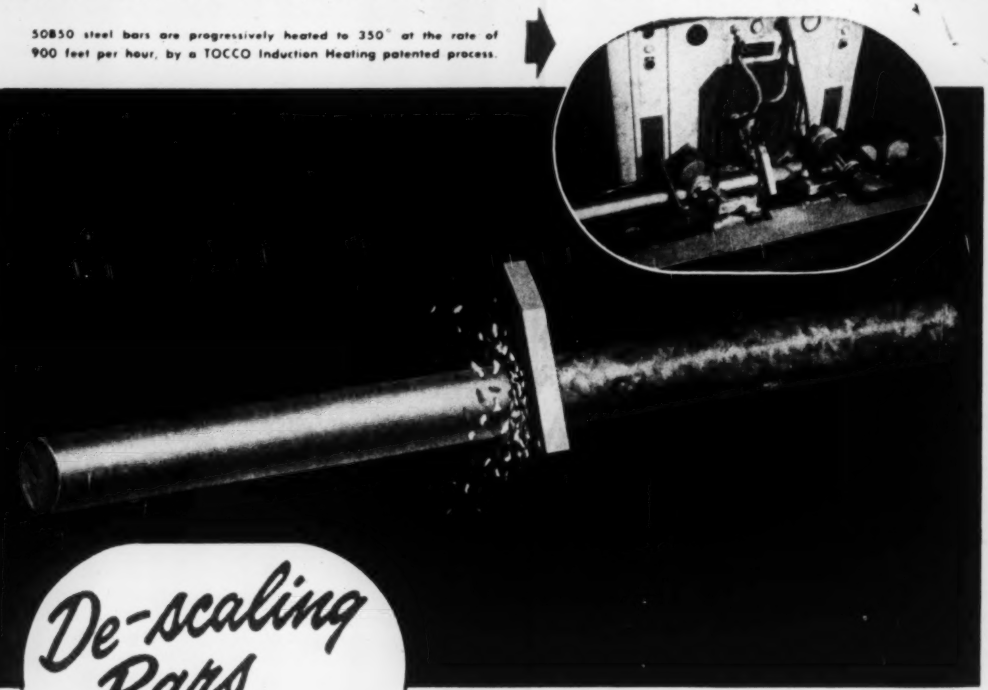


WORLD'S PIG-IRON RECORD. In October a new world's record for pig-iron production was set by blast furnace "H" at Bethlehem's Sparrows Point plant. The figure: 56,010 tons—which exceeded the amount ever before produced in one month by a single furnace. This was the fourth time the same unit had set a production record.

BETHLEHEM
STEEL

New Streamlined Production Technique That Saves Both Days and Dollars

50B50 steel bars are progressively heated to 350° at the rate of 900 feet per hour, by a TOCCO Induction Heating patented process.



De-scaling Bars with TOCCO* Induction Heating

THE PROBLEM—Axle shaft blanks for famous International Harvester farm tractors are normalized, hardened and drawn in conventional open-fired gas furnaces. Considerable scale is formed by these heating operations which, of course, must be removed. Formerly these heavy bars (85 lbs. each) had to be trucked to tumble mills for cleaning. This took time and money—over $7000 annually in labor costs alone, not counting heavy maintenance expense on the tumble mills.

THE SOLUTION—International Harvester engineers found that by using TOCCO* Induction Heating to raise bar surface temperature suddenly to 350°F the thermal shock removed the scale cleanly and completely. Bars are now *automatically* fed to descaling unit, *automatically* descaled by TOCCO, and *automatically* ejected onto pallets. The draw furnace operator merely "keeps his eye on" the descaling operation—no separate operator is needed—and best of all, expensive and time-wasting trucking to and from the tumble mills has been eliminated.

● If you have descaling, hardening, brazing, forging or melting operations in your plant, chances are TOCCO can save you time and money, too. Experienced TOCCO engineers are glad to work with you for similar cost-cutting results.

see our CATALOG in SWEET'S FILE

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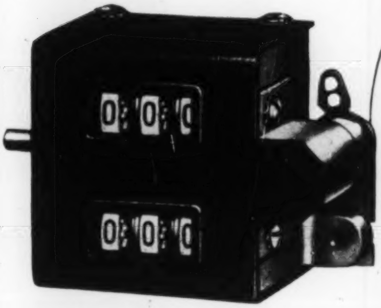

"Round and round
and round they go–
and what they count:
only radarmen
know!"

Everyone Can Count on
VEEDER-ROOT

Yes, this time as before, every arm of the service counts on Veeder-Root in some way or other. The counters shown, for instance, supply figures that radarmen readily translate into vital information.

And there are scores of other Veeder-Root Counters, standard and special, electrical and mechanical, that "talk the language" of more military and civilian jobs than you can shake a slide-rule at!

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STEEL

The Weekly Magazine of Metalworking

VOL. 130 No. 1 JANUARY 7, 1952

1952 METALWORKING YEARBOOK ISSUE

$2.00 PER COPY

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Next Week... Extrusion Plus Forging—Simplifies Aluminum Forming... Stainless Brazed Without Fluxing.. Investment Casting—Money-Saving Mass Producer... Disintegration Becomes Production Necessity

Published every Monday by the Penton Publishing Company, Penton Building, Cleveland 13, Ohio. Subscription in the United States and possessions, Canada, Mexico, Cuba, Central and South America, one year $10; two years $15; all other countries, one year $20. Single copies (current issues) 50 cents. Metalworking Yearbook issue $2.00. Entered as second class matter at the postoffice in Cleveland, under the Act of March 3, 1879.

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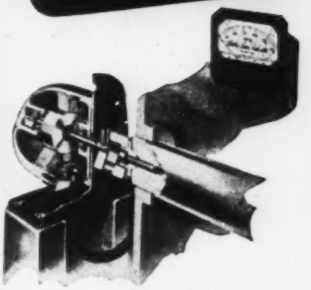

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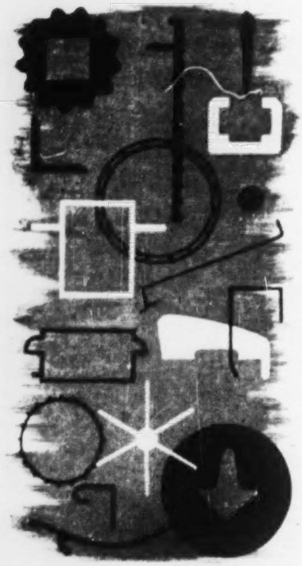

A profile of WERNER Aluminum Services

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Behind the Scenes...

Sound the Trumpets

You're now holding in your hands (or have before you on the desk) 3.1 pounds of paper, ink, glue, staple, the product of 29 editors, 10 artists, 18 people in the advertising and scheduling departments and 150 in the press division. They have pooled their efforts to bring you in STEEL's Yearbook issue more than 575 pages of information that will be helpful for at least the next 12 months.

In a run of 28,000 copies, 100,000 pounds of paper were used, or two car-loads. A half-ton of black ink was required, 250 pounds of various-colored inks and 200 pounds of glue. It's one of the biggest books we've ever put out and necessitated more than 1 million press impressions to produce.

We're proud of this issue—from the front cover to the last ad on the back cover. We especially commend to your attention the Metalworking Destiny story that begins on p. 115, the Facts & Figures Section that starts on p. 167 and the Technical Forum beginning on p. 217.

Changes

Starting with the next issue, STEEL will make several typographical changes. In its regular news and production-engineering pages it will shift to 9 on 11 point Ideal, on a 13-em measure that's slightly wider than two inches. In the regular news pages a slightly smaller type had been used.

The idea, of course, is to save your eyes, make the book more readable.

New Men

Two new men are joining the staff. They're Bob Jaynes and John Kelsey, who become assistant editors.

Bob is married, has two children. He took his B.S. in journalism from the University of Illinois and his M.S. in history from Bowling Green State University, Bowling Green, O. He was an ensign in the Navy until 1946. From that date until joining STEEL he has worked for Bowling Green State University and has been in charge of all official University publications.

John attended Yale University and graduated from Western Reserve University in Cleveland where he majored in history and English. He served in the Army and since graduating from Reserve he has been traveling in Europe.

Both those men for the time being will spend most of their time writing and editing in the news section of the magazine.

On Taxis

We see by the paper that a helicopter taxi service is being inaugurated in metropolitan New York. We don't know about the idea. If helicopter drivers turn out to be anything like ground cab drivers, we'll stick to the subway. We're still smarting from the occasion when a cabbie took us to a remote section of Brooklyn where his car broke down and it took us two hours to get to our destination.

We have read about and seen in the movies these whimsical characters who are supposed to drive the nation's cabs. We have yet to hear an amusing, whimsical or astute bit of talk from a taxi driver.

We have, though, one well-authenticated story about a man who regularly rides in cabs. A Chicago business man with an office near the Loop lives in Wilmette. Every morning his wife drives him to the railroad station. He walks into the station, waits until his wife has driven away, then walks out and takes a cab downtown. He doesn't like trains.

Cheesecake

We are in receipt of some unusual cheesecake—a picture of a shapely lady named Suzie. Suzie is a burro and one of man's oldest means of transportation. Owned by McClelland Supply Co., Phoenix, Ariz., she is used to make deliveries on supplies to out-of-the-way locations. Like all burros, Suzie has a limit on the weight she will carry and a "built-in scale" to tell her when she's reached that point. Her limit is 135 pounds; she stages a sit-down strike if another pound is added.

Shrdlu

(Metalworking Outlook—Page 107)

15,000 parts per day, and

NO DOWN-TIME FOR REPAIRS IN MORE THAN 6 YEARS!

COST-CUTTING FACTS

from production lines of another user of

MULTIPRESS®

FOR MORE THAN SIX YEARS the Multipress at right, above, has been handling nearly 2000 parts per hour . . . eight hours per day . . . five days per week — *with absolutely no lost time or expense for repairs!*

Cost-slashing dependability like this adds *extra value* to the fast, oil-smooth efficiency and accurate pressure control of Multipress. Production men know that down-time costs more in lost output than in repair expense.

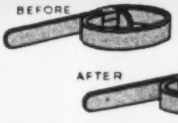
A two-in-one job is performed in an all-automatic operating sequence by this 4-ton Multipress, at the Punch-Lok Company, of Chicago—bending tabs and locking arches on ten different sizes of steel clamps, as sketched at right.

Finished parts were also of better quality, and more uniform, after Punch-Lok switched to Multipress. Tooling changes for different clamp sizes were quicker and easier to make. And tool wear was reduced to the extent that most parts of it could be made from cold rolled steel, instead of costlier tool steels.

When increased business demanded it, Punch-Lok added a second Multipress, seen at left, above.

Multipress is available in one-ton to 50-ton frame sizes and capacities — custom-equipped with manual or automatic controls and other operating features for eye-opening results on hundreds of different operations. Hydraulically interlocked Index-Table Feeds, Automatic Stock Feeds, and other production-speeding accessories also available.

Write for complete information on Multipress equipment today!



Punch-Lok's clamp shown before and after the MULTIPRESS operation. Locking device is arched as tab is bent.

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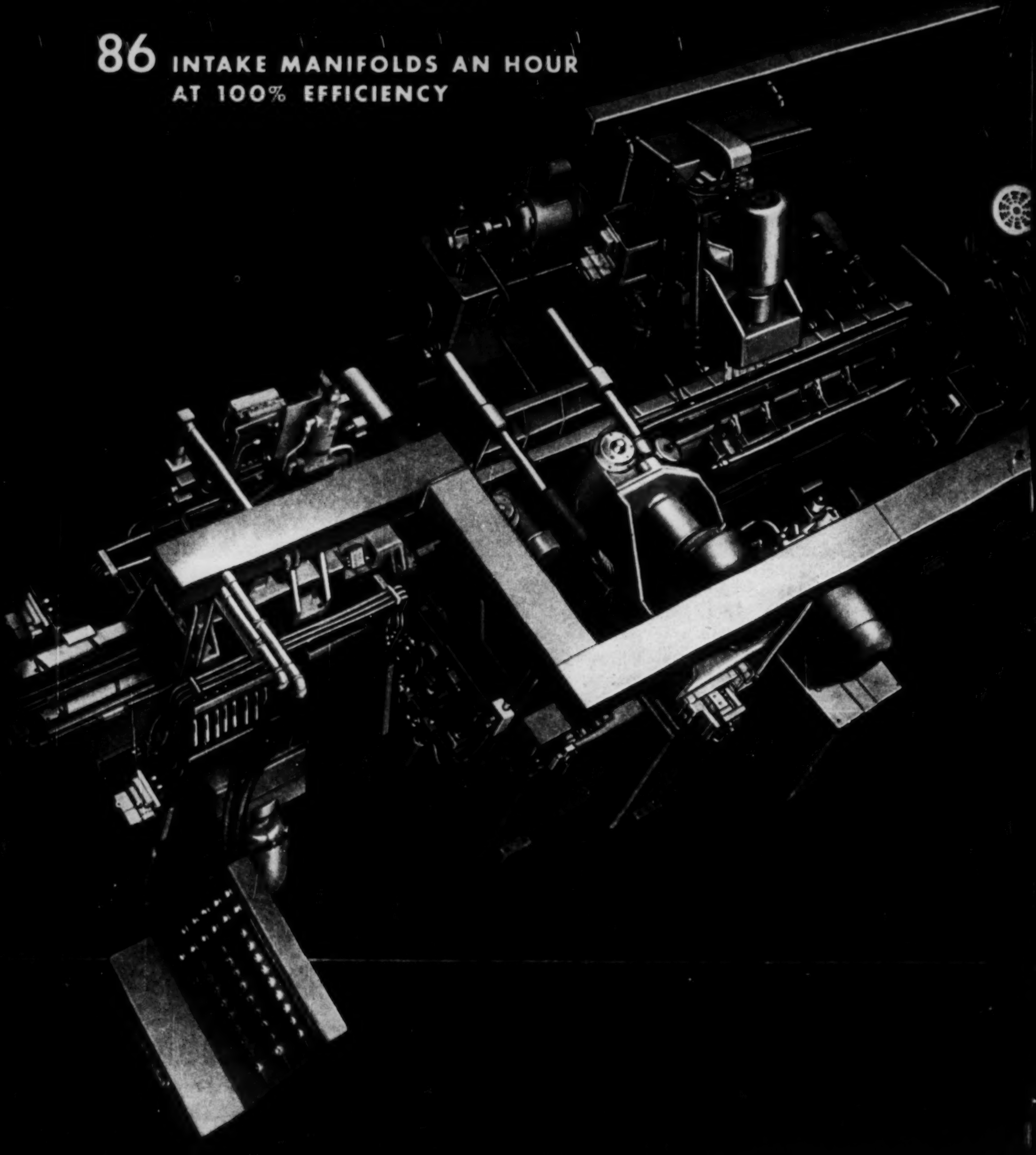

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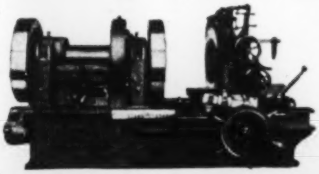

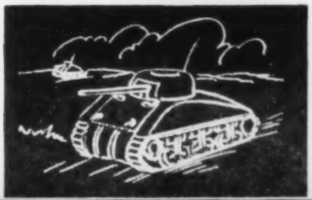

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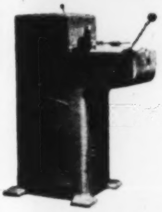

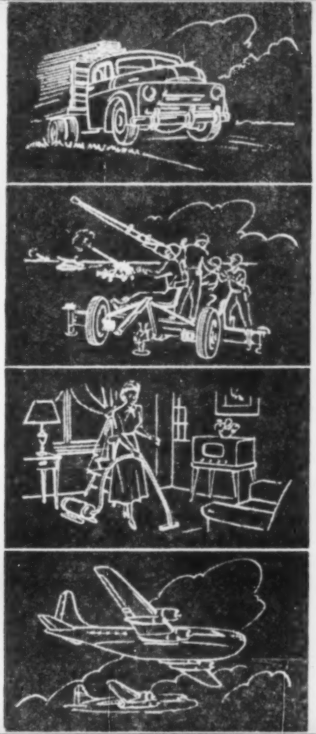

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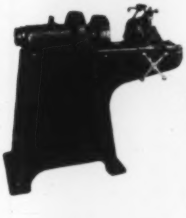

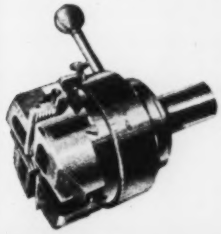

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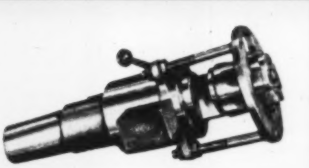

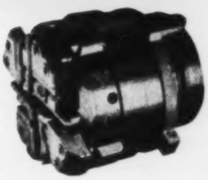

tru·steel*

lasts 12 times longer

than ordinary abrasives

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COMPARISON CHART

	CHILLED IRON	TRU-STEEL
[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]

savings (96 Wheel Hours) **3190 lbs.**

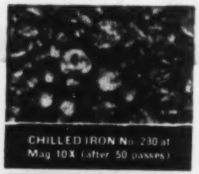
How would you like to cut your abrasive consumption 91%? It sounds fantastic, but that's exactly what happened at the Carbon Malleable Castings Company when they switched to Tru-Steel Shot. For, 310 lbs. of Tru-Steel cleaned a quantity of work requiring 3500 lbs. of chilled iron. Wearable parts, such as blades, impellers, control cages, end liners and deflectors, all had 3 to 5 times longer life.

HERE'S WHY
TRU-STEEL lasts longer

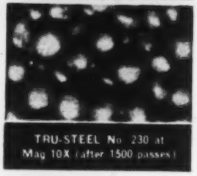
Tru-Steel Shot is perfectly formed of electric induction furnace steel that has received a full heat treatment . . . not just a draw or anneal. It is round and solid, hard and tough, and accurately controlled as to quality and hardness.

With Tru-Steel, wearable parts last longer and less machine maintenance is required. There is less abrasive to ship and store, and cleaning costs per ton are much lower.

Pound for Pound Tru-Steel Shot will clean more work than any other abrasive you can use. A test will prove this for you.



CHILLED IRON No. 230 at Mag 10X (after 50 passes)



TRU-STEEL No. 230 at Mag 10X (after 1500 passes)

Mfg. by Steel Shot Producers, Inc., Butler, Pa.

TRU-STEEL SHOT -American

OFFICES IN PRINCIPAL CITIES

AMERICAN WHEELABRATOR & EQUIPMENT CORP. 509 S. Byrkit St., Mishawaka 5, Ind.

LETTERS
TO THE EDITORS

Scrap Shortage Is Real

STEEL
45-DAY
SCRAP
SUPPLY
?

In your Nov. 26 issue, p. 58, you quote NPA: "A sampling of mills showed inventories of steel scrap were up to almost a 45-day supply (compared with a low of 36 days in April)." In our local paper, we read, "In the Pittsburgh area, steel mills have only about a three-day supply."

What's the real story behind this apparent discrepancy?

D. F. Barnum
Barnum-Bruns Iron Works
Norfolk, Va.

● *The NPA figures are based on a survey of steel producing plants. They show the average of scrap inventories at the mills covered. They do not reflect the desperate situation of some individual mills. The plight of the Pittsburgh steel mills is more critical than those in other sections.*

Actually, the scrap picture is extremely serious everywhere. If scrap collection campaigns are pursued diligently, there should be just about enough scrap to keep our mills and foundries operating at capacity. If the campaign bogs down, we may expect some loss of production.

Sequel on Covers

Would you kindly forward two or three front covers of recent issues of STEEL suitable for bulletin board mounting.

D. E. Chapman
technical library
Trico Products Corp.
Buffalo, N. Y.

● *They're on the way.*

Survey in Steel

Could you supply us with reprints of articles which may have appeared in STEEL relating to laminated steel.

Karl F. Lukens
manager of sales
Wheatland Tube Co.
Philadelphia

● *Sent are clippings on this subject that have appeared from 1948 through 1951.*

Data on LP Gas

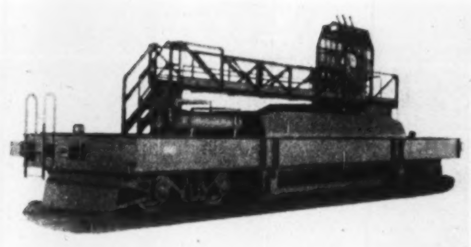
We are developing information on propane gas tanks, and are primarily concerned with the pressed or dished heads used on these tanks. Can you give us any data?

A. W. Schmidt
market research department
Wickwire Spencer Steel Division
New York

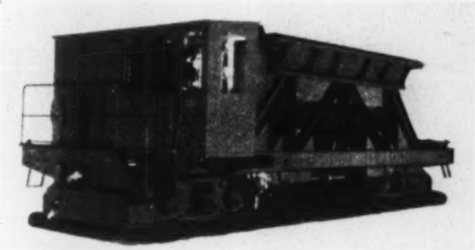
● *Tearsheets of STEEL's LP gas study (Feb. 5, p. 57) are being forwarded. You may want a copy of Pamphlet 58, compiled by Liquefied Petroleum Gas Association, 11 S. La Salle St., Chicago 3, which is mentioned in this article.*

a familiar sight . . .
in America's Steel Plants

Sound engineering and solid construction have made Atlas Cars outstanding in the Steel Industry for service and dependability. Atlas engineering service is available to help you plan equipment to meet your plant's operating needs.



Thirty-ton double-hopper Scale Charging Car. Operator's platform above hopper facilitates bin gate operation.



Sixty-ton bottom dump Ore Transfer Car with hydraulic discharge gates, brakes and horizontal pusher arm.

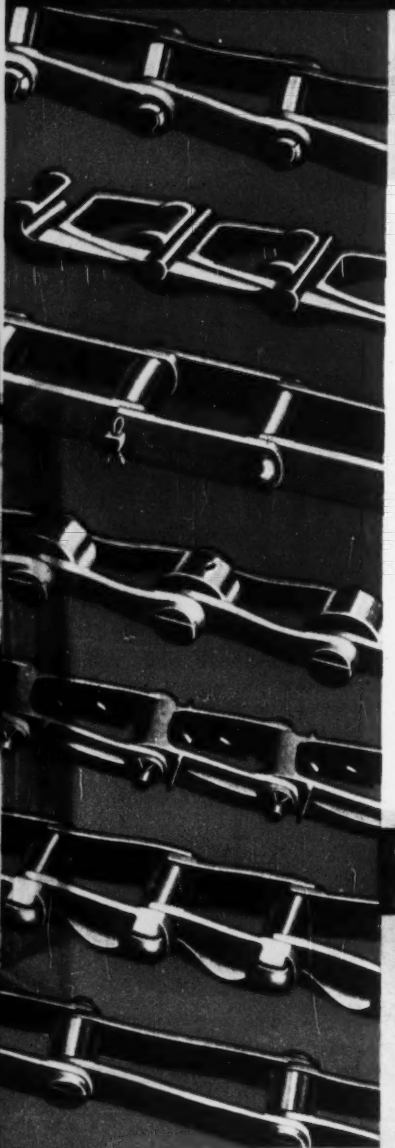
Builders of: Scale Charging Cars and Ore Transfers; Indicating and Recording Dials for Weighing Scales; Electric and Storage Battery Locomotives; Coal Charging Cars; Door Extractors; Coke Quenching Cars, Turntables.

THE ATLAS CAR & MFG. CO.

1140 IVANHOE RD.
CLEVELAND 10, OHIO, U.S.A.

FARRELL-CHEEK'S

INDUSTRIAL CHAIN



Outstanding Qualities

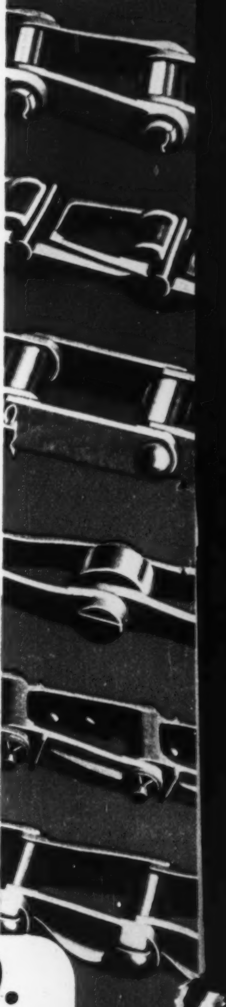
Industrial chains from Farrell-Cheek have a record of superb performance wherever there is material to be conveyed. Designs by experienced engineers, rigid factory controls, and careful manufacture furnish chains that have proven highly dependable under the severest of conditions in the field.

Ideal Steels

Farrell's "85" is a special analysis steel which has been developed to give the requisites of toughness, strength, rigidity and ductility which are so important in conveying and elevator chains. Cast links of F "85" are exceptionally resistant to abrasive wear and severe loads.

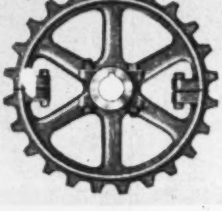
Chain Attachments

Farrell's "85" chain attachments are designed to work in harmony with all Farrell-Cheek cast chains. Manufactured to close tolerances, of the same steels and with the same care as the chains themselves, they are available in a variety of styles or can be designed to fit any special or standard need.



CONVEYOR BUCKETS AND SPROCKETS

Farrell's buckets and sprockets are made in many standard and special patterns . . . tough, strong and rigid . . . unmatched in their ability to give many times longer wear.



FARRELL - CHEEK STEEL CO.

MANUFACTURERS OF HIGHEST QUALITY ELECTRIC FURNACE CARBON AND ALLOY STEEL CASTINGS

FARRELL'S CARBON STEEL CASTINGS

FARRELL'S HARD EDGE STEEL CASTINGS

FARRELL'S "85" STEEL CASTINGS

RAILROAD CASTINGS
Locomotive and Car
R. R. Specialty Castings

ELEVATOR, CONVEYOR PARTS
Sprockets, Traction Wheels, Chains, Buckets, Rollers, Idlers.

BUSHINGS
Carbon and Alloy Steels Machined, Hardened, Ground.

CRANE WHEELS
Overhead, Gantry, Monorail, Ingot Car, Charging Machine.

GEARS AND PINIONS
"True Tooth" Gears and Pinions, Sheaves and Wheels

SPECIALIZED CASTINGS
Light Section Castings

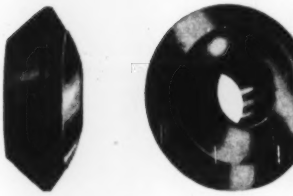
STOKER PARTS
Feed Screws, Furnace Tools, Flanged Pipe, etc

HEAVY HARDWARE
Wire Rope Fittings, Choker Hooks, Bar Benders, Cutters

YOUR INQUIRY WILL PROMPTLY BRING DETAILED INFORMATION PERTAINING TO ANY OF THE ABOVE FARRELL-CHEEK PRODUCTS

SANDUSKY, OHIO U.S.A.

MACHINING FACILITY IS TANGIBLE

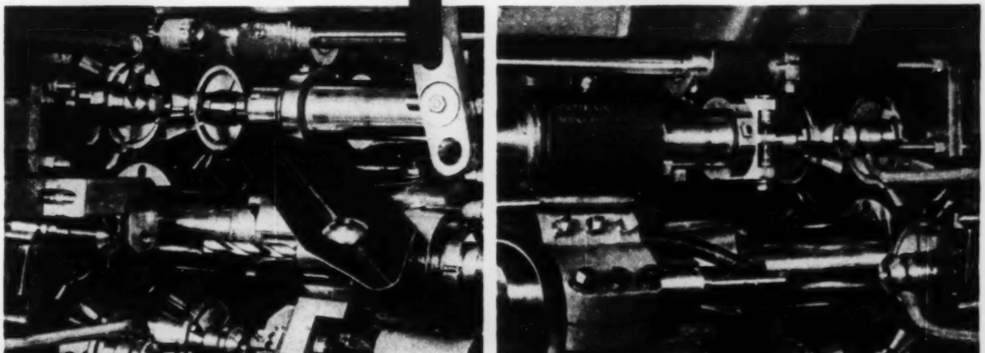


In the production of alloy steel bevel gear blanks on a 2⅝-SIX CONOMATIC, the "all position" endworking attachment facility simplifies the face and hole burnishing operations.

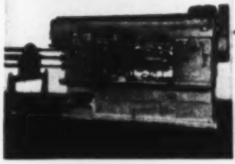
"AUTOMATICS" are good examples of mechanized teamwork. Their main function is to follow through and keep running. But a weak frame, a cramped tooling area, or an inadequate tool support, of one machine alone, can lower the production average of an entire battery.

The extra values that pay off in an "automatic" are not just *wished* into the machine; they are *built* there. And only complete information will disclose whether or not they *are* built there. You may have complete information on CONOMATICS.

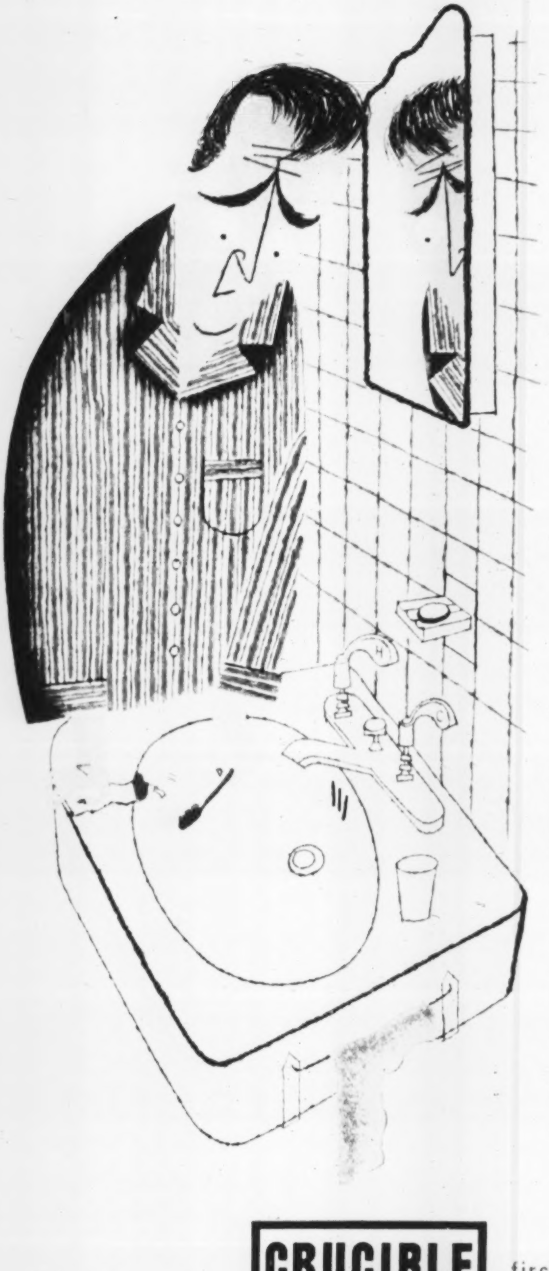
A Comparison of ALL Automatics is in favor of Cone



FRONT AND REAR SIDES OF TOOLING AREA



Conomatic CONE AUTOMATIC
MACHINE COMPANY, INC.
WINDSOR, VT., U.S.A.



make every bit of stainless count

Wise and efficient use of available stainless steel stocks can go a long way to making sure that all defense and industry needs are met.

Getting the best available materials for your job is a vital first step—Crucible, pioneers in the development of stainless steels, urges you to take full advantage of our metallurgical staff and stainless fabricating specialists. Their wealth of experience—based on thousands of stainless applications—can help stretch your stainless supply. There is no other metal that can work the same "miracles" as stainless, and these Crucible metallurgists can help you select the best available stainless grades for your needs.

It's up to you to make every bit of stainless count—we're equipped to help you do it. When your problem is stainless—call on us.

CRUCIBLE first name in special purpose steels

52 *years of* *Fine* *steelmaking*

STAINLESS STEEL

CRUCIBLE STEEL COMPANY OF AMERICA, GENERAL SALES OFFICES, OLIVER BUILDING, PITTSBURGH, PA.

STAINLESS • REX HIGH SPEED • TOOL • ALLOY • MACHINERY • SPECIAL PURPOSE STEELS

Vol. 1 Published by The DoALL Company, 254 N. Laurel Ave., Des Plaines, Illinois No. 1

"DoALL Surface Grinder 50% Faster; Makes Possible 30% Greater Tool Life" at Reltool Corporation, Milwaukee

Machine Rigidity and "Cool-Grinding*" Credited

The possibilities for time and cost savings possible through use of modern DoALL Precision Surface Grinders are evidenced at Reltool Corp., producers of tools and dies. According to A. G. Thomas, V. P. of Reltool, their new DoALL Grinder is approximately 50% faster and much more satisfactory than the machine previously used. Both the increased speed and 30% greater tool life is credited to the DoALL "Cool-Grinding" attachment which prevents over-heating of the work surface and to the rigidity of the machine which makes possible deeper cuts in one pass.

In DoALL "Cool-Grinding" the coolant, metered into the hub of the wheel, flows through the pores and out at the point of contact in a fine mist. There is always coolant at the contact point of wheel and work, unlike flood cooling where the wheel blasts the coolant away from the point of contact.

The unusual rigidity and precision accuracy of DoALL Grinders is evidenced in demonstrations wherein a .010" cut, with a .010" cross feed, can be taken in tool steel and the wheel backed out of the cut without "spark-out" or contact. Actually, deeper cuts have been taken without spark-out.

Your DoALL Sales-Service Store listed on the back is equipped to demonstrate DoALL Grinders at any plant. Literature is also available upon request.

---

*U.S. Patent No. 2470350

DoALL Saw Bands, Other Band Tools Available from Local Stocks

DoALL Stores Carry Bands for All Makes Band and Cut-off Saws

DoALL
SAW BANDS
In Exclusive
"Strip-Out"
METAL BOX

DoALL Band Tools are available in exclusive "strip-out" metal containers for safety, protection and convenience.

Because of recent enlargements of manufacturing facilities all types of DoALL band tools are now available for immediate delivery from stocks of the 35 DoALL Sales-Service Stores in North America. Bands can be purchased in lengths cut and welded to fit any machine or in 100 and 500 foot lengths. There is no limit at present to the number of feet of blade that will be sold to an individual customer.

The complete line includes 16 different types of band tools for sawing, cutting, grinding, filing, honing and polishing all metals, plastics, woods, glass, ceramics, stone, leather, paper, cloth, rubber and other non-metallics and for friction sawing metal.

"Greatest Selection of Ground Flat Stock"

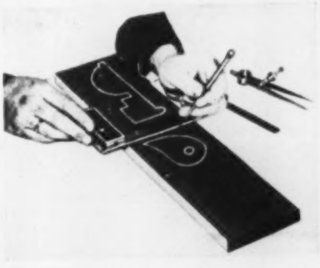
Available Locally for Immediate Delivery

Over 200 standard sizes of Precision Ground Oil Hardening Tool Steel, the greatest selection of sizes available anywhere, can now be delivered immediately by the 35 DoALL Sales-Service Stores in the United States, Canada and Mexico. Special sizes can also be supplied on short notice.

Users can order the size best suited to their needs for making tools, dies, gages and parts, thereby minimizing waste and reducing costs.

DoALL Ground Flat Stock is of highest quality and uniform analysis and is individually packaged for protection of the steel and convenience in handling.

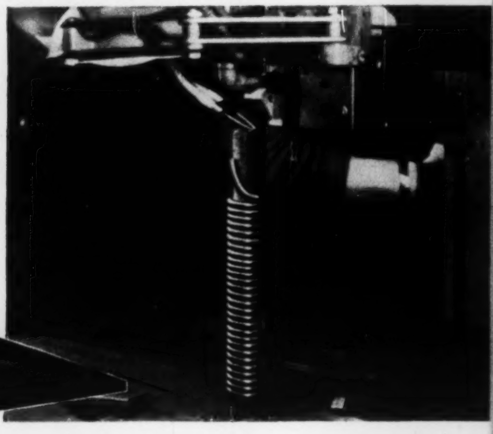
Information and copies of the convenient new 11¾" by 17" Wall Chart listing all standard sizes of DoALL Ground Flat Stock can be secured from your local DoALL Sales-Service Store listed on the back.



Layout on DoALL Ground Flat Stock made with DoALL Steel Ink — ready for cutting on a DoALL Band Machine.

DoALL BAND SAVES MAN HOURS,

DoALL
SAW BANDS
In Exclusive
"Strip-Out"
METAL BOX



BAND MACHINING DOES JOB IN ⅓ THE TIME — this job of splitting rings from coiled ¼" cold rolled steel was formerly done on an expensive milling machine. On a DoALL Contour-matic it is done *in ⅓ the time and at far less cost!*

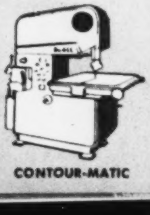
THE DoALL CONTOUR-MATIC (illustrated at upper left)

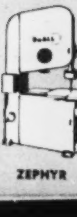
This is the most versatile, fastest cutting machine ever introduced to American Industry. It will pay for itself faster than any other machine tool equipment you can buy. Anyone can learn quickly to operate it. Its 40 to 10,000 feet per minute speed range, its hydraulic and automatic controls, its labor-saving accessories make it the most productive band machine in the world and one of the most valuable single pieces of equipment you can own.

SAW BANDS, OTHER BAND TOOLS FOR EVERY PURPOSE
Immediate Delivery from Local Stocks

Saw bands for all makes of band machines and cut-off saws, knife bands, "line-grind" bands, file bands, diamond bands now available immediately from any one of the 35 DoALL Sales-Service Stores in the United States, Canada and Mexico. Sold in 100 and 500 ft. lengths or cut and welded bands to fit your machine. Fill your requirements now.

B-13


CONTOUR-MATIC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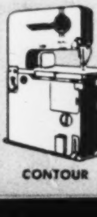
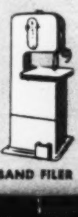
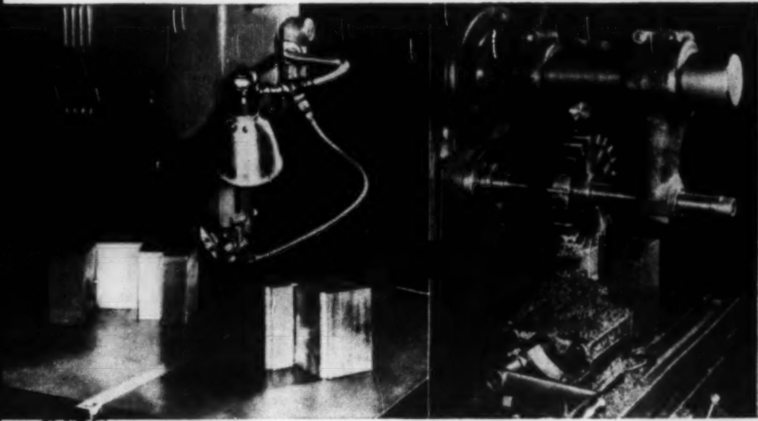

CONTOUR


BAND FILER

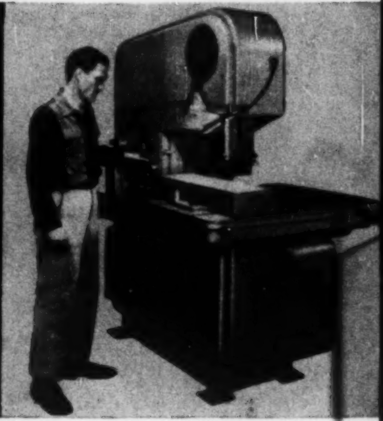
SAW BANDS

DoALL PRODUCTION NEWS

MACHINING
METALS AND MACHINES



CONTOUR MACHINING SAVES METAL BY CUTTING OUT COMPLETE PIECES — these pictures tell a terrific story. Here are two identical shapes cut from identical stock. Ordinary machining reduces it to a pile of chips. Contour machining saves the slug of metal for other use.



DoALL CONTOUR-MATIC FREES $35,000 MILLIN MACHINE FOR OTHER WORK — rough cutti of aluminum forgings on DoALL Contour-ma — a machine that represents only about 1/ of the capital investment in milling machin formerly tied up on this operation.

THERE IS a place for DoALL *Band Machining* in every industry for production or maintenance work. It is one of the significant developments in the machining of metals or the cutting of any material:

Cuts Continuously — the endless band slices through the material, cutting all the time, all the way, leaving only a thin slot in its wake. It's the world's fastest method of machining the greatest variety of materials to shape.

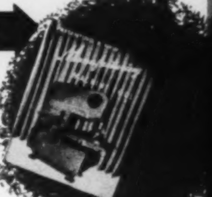
Direct Cutting of Intricate Shapes — it's easy to follow any layout line with the narrow band tools used.

Cuts Any Material — there is a DoALL Band Tool for every sawing, filing, grinding, polishing or friction sawing job on all metals, glass, wood, cloth, leather, rubber, paper, plastics and other materials. Use it to make tools, dies, jigs, parts; to trim, shape, file, polish.

A Machine for Every Purpose and Every Pocketbook — from the inexpensive "Utility" series to the versatile, all-purpose Contour-matic, there is a DoALL Band Machine for you — the most complete line in the world. Ask to have a free DEMONSTRATION made for your people *in your own plant*. Call your local DoALL Sales-Service Store or write:

THE DoALL COMPANY, 254 N. Laurel Ave., Des Plaines, Ill.

SEND FOR THIS CATALOG

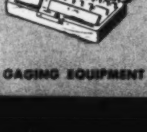


Learn what DoALL Band Machining can do to save manhours, metals and machines for you — it's a key answer to more production.

DoALL *for More Production*

TOOLROOM GRINDER

CRUSH GRINDER



GAGING EQUIPMENT

MONOLITE

MOBILE INSPECTION UNITS

TOOL STEEL

New 24-Page DoALL Catalog Describes Uses of Gages and Accessories; Covers Calibration Service, Mobile Inspection

Just off the press, a new 24-page Gage Block Catalog tells the 10 big reasons why you can trust DoALL Blocks to maintain dimensional quality control in your manufacturing, explains why gage blocks are necessary and how their many uses make them so valuable in providing precision dimensional control for all plants regardless of size.

Fully illustrated, the catalog describes all DoALL Block sets, from 6 to 118 pieces, both English and Metric, and explains their use for checking tools, parts and other gages.

New Monolite Illustrated

Gaging Accessories such as holders, scribers and sine bars, are described and pictured in actual use. Also included is a description of the new DoALL Monolite and optical flats used to read millionths-of-an-inch variation in size and surface with light interference bands. The accompanying illustration compares the new DoALL Monolite with the previous model. The new unit is a direct result of DoALL's continuous pioneering in development of equipment for measurement with light waves.

The DoALL four range electric Comparator Gage is described as are precision granite surface plates.

Reading left to right: New DoALL Block 24-page catalog; 83-piece DoALL Block set; the new, larger, higher intensity DoALL Monolite alongside the previous model.

Mobile Inspection Discussed

The new catalog explains briefly how the DoALL Mobile Inspection Unit, used to check shop gages at the point of work, can save manhours and money and reduce rejects.

Other points discussed include DoALL Calibration Service for all makes of gage blocks, availability of DoALL technical literature and DoALL demonstration service. Copies of the Catalog may be secured from any of the Sales-Service Stores listed below.

CALL DoALL locally at these Sales-Service Stores

BALTIMORE 12, MD.
5621 York Rd.
Call DoALL: Hopkins 5340
BIRMINGHAM 4, ALA.
800 N. 24th St.
Call DoALL: Birmingham 3-0502
BROOKLINE 46, MASS.
89 Washington St.
Call DoALL: Longwood 6-9555
CEDAR RAPIDS, IOWA
624 Fifth St., S.E.
Call DoALL: Cedar Rapids 3-0616
CHARLOTTE 2, N. C.
405 S. Mint St.
Call DoALL: Charlotte 4-2579
CHICAGO 39, ILL.
4650 W. Fullerton
Call DoALL: Albany 2-5300
CINCINNATI 2, OHIO
536 Sycamore St.
Call DoALL: Main 3929
CLEVELAND 3, OHIO
6517 Euclid Ave.
Call DoALL: Express 1-1177
DALLAS 2, TEXAS
1628 Industrial Blvd.
Call DoALL: Sterling 3819
DAYTON, OHIO
725 S. Main St.
Call DoALL: Michigan 2121
DETROIT 27, MICH.
15010 Plymouth Rd.
Call DoALL: Broadway 3-4141
DENVER 4, COLO.
1187 Stout St.
Call DoALL: Alpine 7444
GRAND RAPIDS 7, MICH.
410 Hall St., S.E.
Call DoALL: 5-2191
HARTFORD 5, CONN.
45 Farmington Ave.
Call DoALL: Hartford 5-6664
HOUSTON 2, TEXAS
121 St. Emanuel
Call DoALL: Capital 6588
INDIANAPOLIS 2, IND.
1401-3 N. Illinois St.
Call DoALL: Plaza 6496
JACKSONVILLE 7, FLA.
1106 Kings Ave.
Call DoALL: Jacksonville 9-7087
KANSAS CITY 6, MO.
1019 E. Truman Rd.
Call DoALL: Harrison 5857
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1316-18 S. Santa Fe
Call DoALL: Trinity 3871
MILWAUKEE 5, WISC.
2427 W. North Ave.
Call DoALL: Division 2-2950
MINNEAPOLIS 14, MINN.
2510 University Ave., S.E.
Call DoALL: Gladstone 1173
St. Paul—dial red "O" for Zenith 239
NEW YORK 10, N. Y.
67 Lexington Ave.
Call DoALL: Murray Hill 4-1514
NUTLEY 10, N. J
88 Park Ave.
Call DoALL: Nutley 2-6767
PHILADELPHIA 21, PENNA.
2053 E. Glenwood Ave.
Call DoALL: Cumberland 8-7400
PITTSBURGH 21, PENNA.
600 Rebecca Ave.
Call DoALL: Fremont 1-5200
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215 Central Ave.
Call DoALL: Hamilton 8420
ROCKFORD, ILL.
123 Seventh St.
Call DoALL: Rockford 47848
SAN FRANCISCO 3, CALIF.
952 Howard St.
Call DoALL: Garfield 1-4784
SEATTLE 22, WASH.
520 E. Pike St.
Call DoALL: East 7500
ST. LOUIS 6, MO.
1945 N. Broadway
Call DoALL: Central 3620
TOLEDO 6, OHIO
2952 Monroe St.
Call DoALL: Garfield 8309
TULSA, OKLA.
207 W. Archer St.
Call DoALL: 35443

CANADA

MONTREAL, QUEBEC
583 Inspector St.
Call DoALL: University 1264
TORONTO 10, ONTARIO
37 Clarkson Ave.
Call DoALL: Redfern 4238

MEXICO

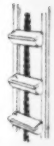
MEXICO CITY, D. F.
Maestro Antonio Casso #48
Call DoALL: Mexicana 36-27-95
or Ericcson 18-63-74

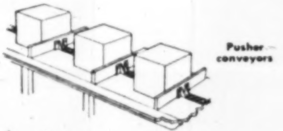
No. 1—88M—12-51

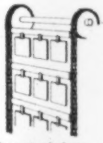
PRINTED IN U.S.A.

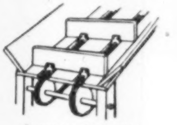
IF "HANDS"
ARE COSTING YOU
TOO MUCH...

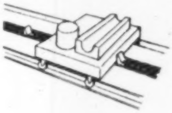
TYPICAL EXAMPLES OF CHAIN CONVEYORS


A vertical conveyor


Pusher conveyors


An extended pin conveyor


A scraper conveyor



No matter how modern your production equipment may be, old-fashioned hand "push-pull-carry" methods of moving materials can keep your operating costs high!

To obtain all the benefits of mechanized production, take the "hand" out of handling with Rex and Baldwin-Rex Chain Conveyors. These efficient materials movers can help you increase production, lower costs, raise profits, better working conditions.

Chain conveyors offer you many advantages. They can run in any direction . . . horizontally, vertically, up and down inclines. They can operate at floor level or at any desired working height. They can carry virtually any type of product through practically every production stage faster . . . at far lower costs than manual handling. They can pace your production operations . . . assure a steady flow of material for the production or processing lines. And, because of this, they eliminate the need for stock piles at machines . . . eliminate costly "waiting time" at the operator level.

Chain conveyors eliminate need for wide aisles . . . assure most effective use of floor space. They eliminate need for storage space, high maintenance and service costs required by other types of handling equipment.

For some helpful suggestions on the use and cost-reduction possibilities of chain conveyors, send for your copy of the informative booklet, "Build Profits by Cutting Handling Costs." Address: Chain Belt Company, 4660 West Greenfield Ave., Milwaukee 1, Wisconsin.

REX

BALDWIN-REX®

Chain Belt COMPANY
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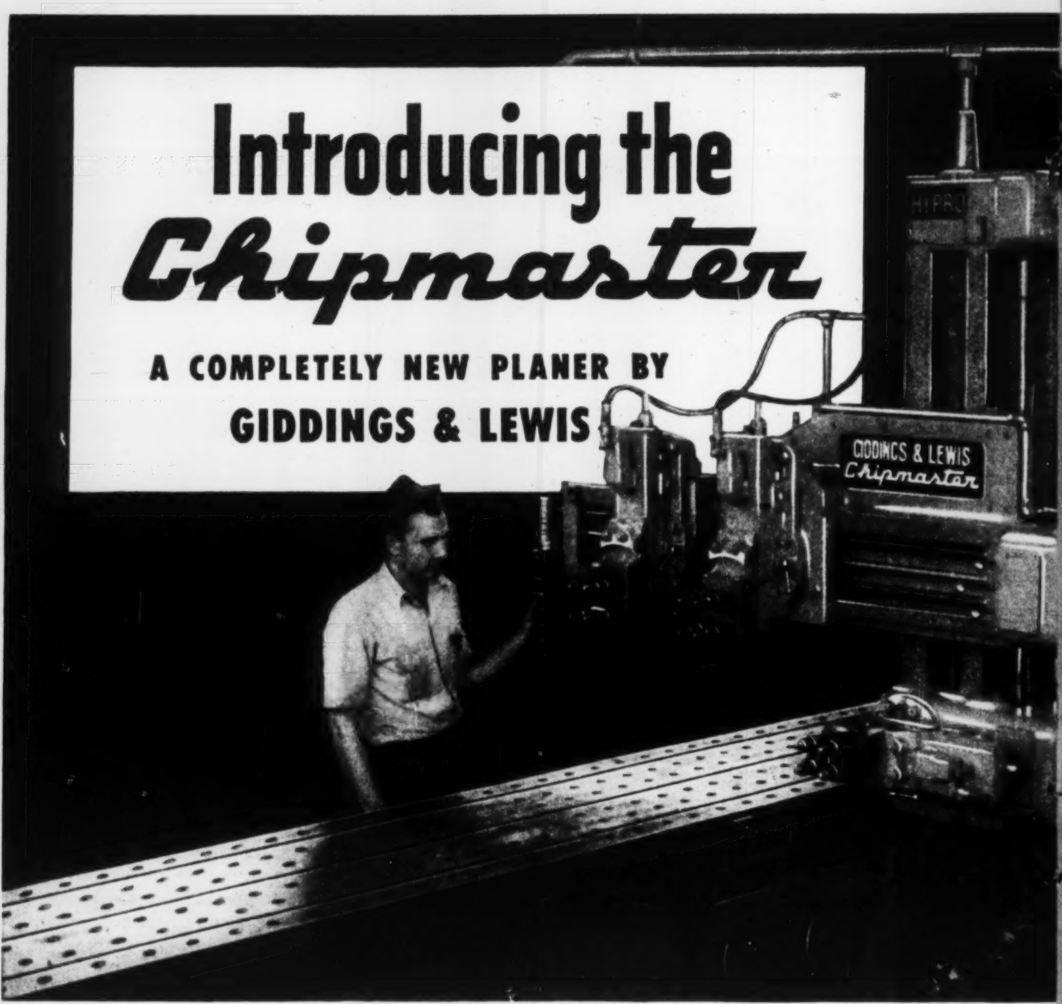


Introducing the *Chipmaster*

A COMPLETELY NEW PLANER BY GIDDINGS & LEWIS

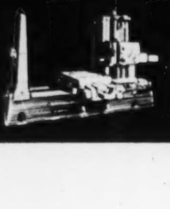
The Chipmaster is a *completely new* open side planer — incorporating the most advanced Giddings & Lewis machine design features . . . available in 24", 30" and 36" sizes.

The efficiency you get — the production you gain — the time and money you save with a Chipmaster will show up big on your cost sheets. It's not a revolution in planing, but its new modern design features and operating efficiency makes it the finest planer yet developed.

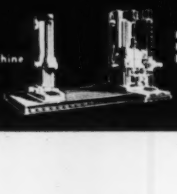
If you have any planer problems, it will pay you to investigate the Chipmaster. Ask for an exclusive Giddings & Lewis "5-Point Job Analysis" of your individual requirements. You'll get an unbiased recommendation that will take the guesswork out of heavy machine tool buying. No obligation. Call your nearest G&L representative or write us direct.

GIDDINGS & LEWIS

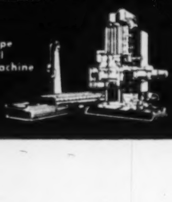
Table Type
Horizontal
Boring Machine



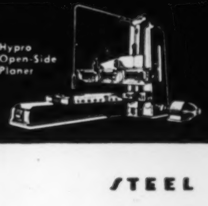
Floor Type
Horizontal
Boring Machine

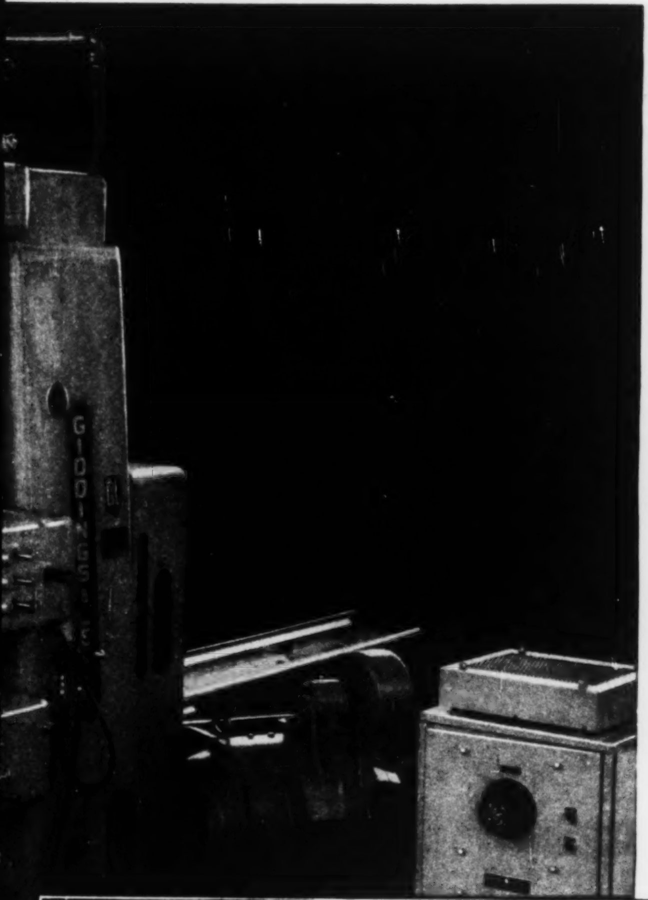


Planer Type
Horizontal
Boring Machine



Hypro
Open-Side
Planer





Here are some of the *Chipmaster's* big new production, construction and operating features

These are only a few of the many refinements which Giddings & Lewis has incorporated into the new Chipmaster — the most advanced planer on the market today.

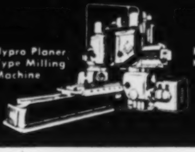
- **Motor Mounted Direct to Bed Eliminates Misalignment of the Motor**
- **Bonded Nonmetallic Ways Prevent Scoring**
  New exclusive Giddings & Lewis method permanently bonds nonmetallic ways to the table. No dowels, pins, screws or bolts are used. Scoring is absolutely eliminated.
- **Combination Air-Hydraulic Tool Feeds Give Fast, Accurate Feed Throughout Entire Range of Planer**
  Feed is so fast that full feed is completed on a very short stroke. Deceleration so smooth that "coasting" is eliminated. Return stroke feed makes overstroking (as in most planers) unnecessary. Two rail heads can be fed together or apart — or both at the same time — to or from the operator. Side head position is not changed by rail movement. A separate unit on face of column provides feed and vertical rapid traverse for side saddle.
- **Antifriction Drive Assures Balanced, Smooth Table Travel**
  On the new Chipmaster — a low-pressure angle rack is used instead of conventional 14½° rack, giving far greater tooth contact between bull gear and angle rack. This means smooth, positive table travel, elimination of bull wheel tendency to lift table. Optional gear ratios offering different table cut and return speed ranges are available at no extra cost.
- **Table Cut and Return Speeds Infinitely Variable**
  Chipmaster's table cut and return speeds can be set to accommodate any type cutting tool, high speed steel or carbide for specific type of cut needed.
- **Quick Selection Levers for Feed and Traverse**
  No hunting for clutch engagement. Operator speed and efficiency aided. Fatigue cut down.
- **Pneumatic Tool Lifter for Each Head**
  Individual air lifters on each head gives individual selection of tool lift. Tools lift fast. Tool drop cushioned to insure shockless seating of the tool block . . . assures accurate work.
- **Micrometer Dials for All Screws and Rods Assure Accurate Settings**

Exclusive New Bed Mounted Motor Drive

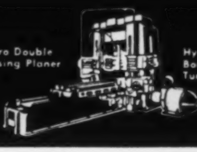
The new Chipmaster's motor is mounted directly on the bed. There is no chance of misalignment. Mounting is permanent. Original installation and later moving the Chipmaster is easy. No expensive foundation changes need be made. It requires only a floor slab of usual thickness. Multiple coupling and floating shafts are completely avoided. You don't have to realign the motor.

MACHINE TOOL CO.

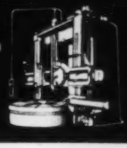
Hypro Planer Type Milling Machine



Hypro Double Housing Planer



Hypro Vertical Boring and Turning Mill



G&L HYPRO

FOND DU LAC
WISCONSIN

YODER
New YODER 4 in 1
Welder Transformer
Gives Up to 60%
Increased Production

In Pipe and Tube Welding

YODER SCORES AGAIN!

● Since the introduction of the Yoder electric resistance weld Tube Mills in 1939, nothing quite so important has happened as the new **Yoder four-in-one Welding Transformer.** Instead of the conventional single rotating transformer, it embodies four smaller transformers surrounding a common core, making a unit of unique compactness and strength which insures longer life and fewer interruptions for servicing. Equally important—impedance is reduced, resulting in higher electrical efficiency.

Compared with the present Yoder welder, production gains up to 20% are recorded. Compared with other tube welders, the gain may be as high as 50% to 60%. All Yoder tube mills henceforth will be equipped with this transformer. It is also available for replacement of welders in other tube mills.

Literature, recommendations and estimates for the asking.

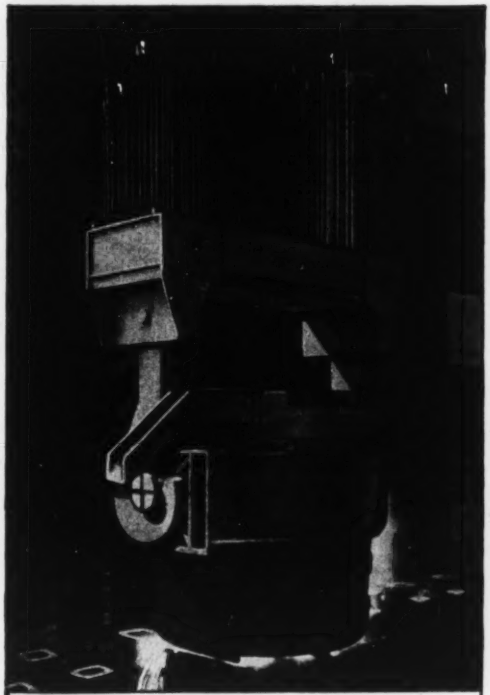
THE YODER COMPANY • 5502 Walworth Avenue • Cleveland 2, Ohio

Complete Production Lines

★ **COLD-ROLL-FORMING** and auxiliary machinery
★ **GANG SLITTING LINES** for Coils and Sheets
★ **PIPE and TUBE MILLS**—cold forming and welding

ENGINEERING YODER MANUFACTURING

WIRE ROPE



ROEBLING ALL-PURPOSE SLINGS with the Tapered Sleeve Splice come to you ready for the job. They cost less than tucked splices . . . have the full strength of the rope. Send for the full story.

Roebling "Blue Center" Preformed works better . . . lasts longer . . . cuts costs

"BLUE CENTER" STEEL wire rope is an exclusive Roebling development. Its high resistance to abrasion, shock and fatigue spells long life. In addition, Roebling Preforming gives you a rope that is easy to handle . . . has better spooling qualities . . . reduces vibration and whipping. This combination makes Preformed "Blue Center" Steel Wire Rope a top performer on the job.

Roebling makes a complete line of wire rope . . . there's a construction for every installation. Have your Roebling Field Man help choose the *right* rope for your equipment. Get his advice on the correct use and maintenance of wire rope. It is based on performance records on thousands of installations. John A. Roebling's Sons Company, Trenton 2, New Jersey.

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What's the best block insulation for 1900F?
SUPEREX ... with the proved record for long service!

The most widely used high temperature block insulation for over a quarter century...

SUPEREX® high temperature block insulation has long been industry's No. 1 choice for service temperatures up to 1900F. It provides *major* economies . . . reduces fuel costs, cuts heat losses, keeps maintenance expense down, costs less to install and has long service life.

These are the reasons why 90% of the nation's hot blast stoves are Superex insulated . . . and why the low cost open hearth steel producers use Superex in their regenerators.

Made of specially selected and calcined diatomaceous silica blended with other insulating materials and bonded with asbestos fiber, Superex will safely withstand temperatures up to 1900F with negligible shrinkage.

Superex has been used with outstanding success in all types of industrial and metallurgical furnaces and ovens, stationary and marine boilers, auxiliary power plant equipment, regenerators, kilns, roasters, high temperature mains, flues and stacks.

Superex has all these important advantages...

Low thermal conductivity—Exceptionally high heat resistance (1900F) combined with excellent insulating value.

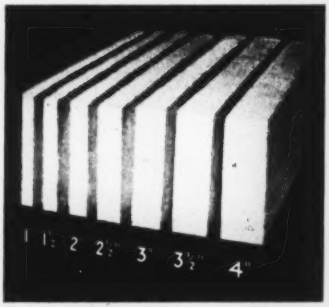
Light weight—Approximately 2 lb per sq ft per in thickness.

Great physical strength—Approximately 6 tons pressure per sq ft are required to compress Superex ⅛ in.

Long, efficient service life—Superex maintains high insulating value indefinitely—will not disintegrate in the service for which it is recommended.

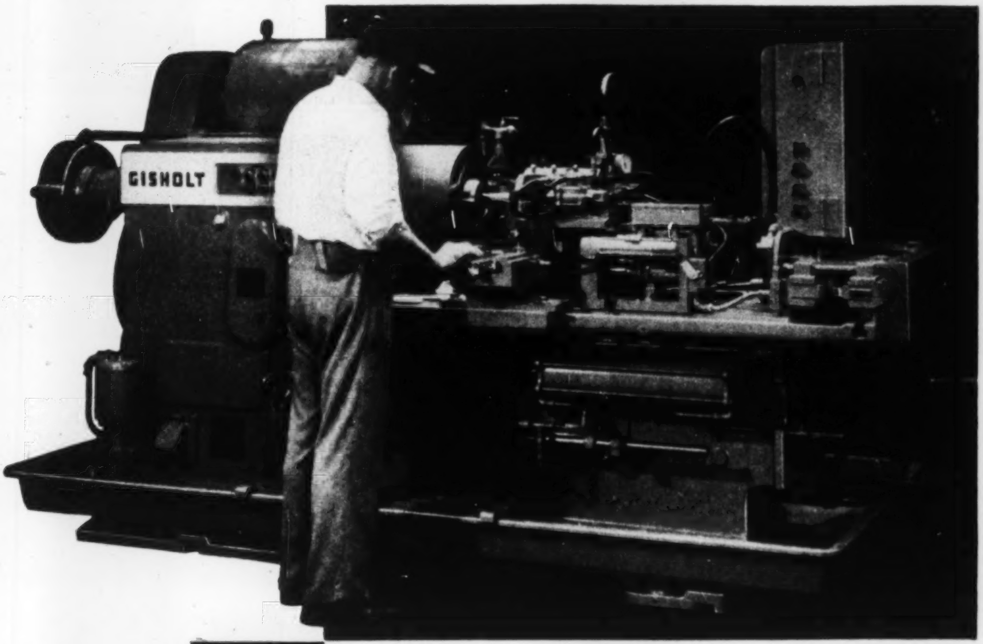
Fast, easy application—Superex may be cut with an ordinary knife or saw for fitting around openings or to irregular surfaces. Because of its light weight and convenient sizes, Superex assures fast and economical installations.

For complete information about Superex block insulation, write for Brochure IN-134A. Address Johns-Manville, Box 290, New York 16, N. Y. In Canada, write 199 Bay Street, Toronto 1, Ontario.



Waste is minimized with Superex because of the variety of thicknesses available. Special shapes and intermediate thicknesses between those shown are also available.

JOHNS MANVILLE JM PRODUCTS **Johns-Manville** *first in* **INSULATIONS**



HOW 8 SIMPLIMATICS

cut machine time 50%
cut man-hours 75%

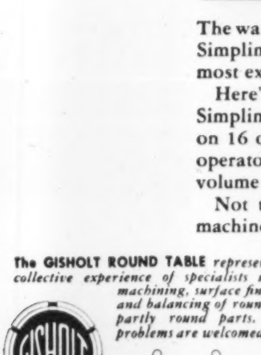
The way you can slash costs with the Gisholt Simplimatic often surprises some of the most experienced production men.

Here's a big shop which found that 8 Simplimatics could take over the job done on 16 other machines. And it takes only 4 operators instead of 16 to turn out the volume of parts required.

Not the least in the cost picture is the machine itself. For the basic Simplimatic design permits you to individualize the machine to a high degree to solve many different problems. Thus, for many jobs you can have all the advantages of a special machine merely with special tooling. Yet it's all done on a Standard Simplimatic—at far lower cost.

The importance of lower costs these days makes it important for you to get all the facts about Simplimatic Automatic Lathes.

The GISHOLT ROUND TABLE *represents the collective experience of specialists in the machining, surface finishing and balancing of round and partly round parts. Your problems are welcomed here.*



In producing these tool joint pins and boxes, the 8 Simplimatics work in pairs with fully automatic operation; one man can easily tend two machines.

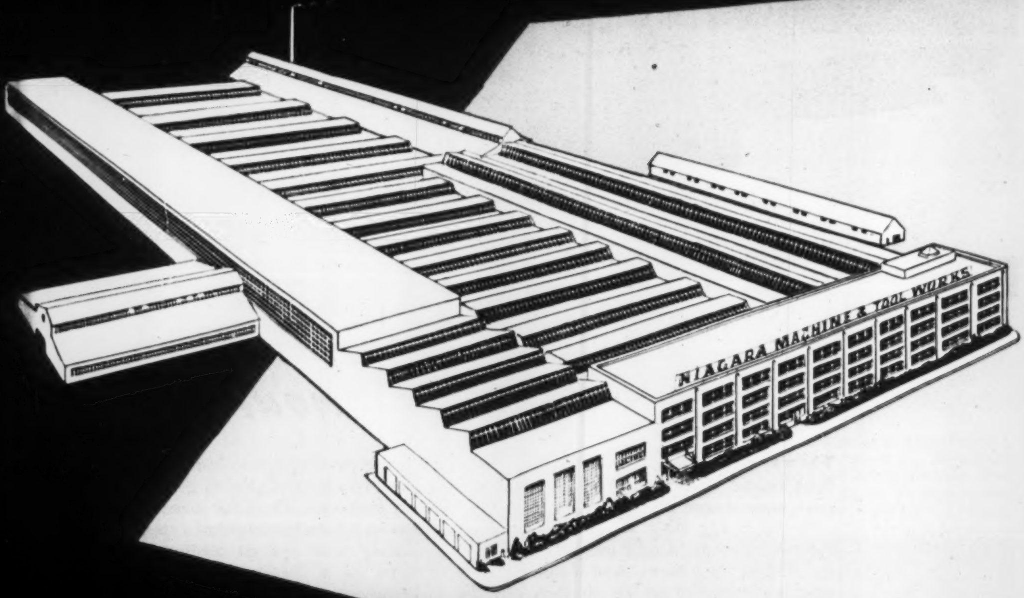
Ask about the many different arrangements possible on the Standard Simplimatics with platen table, vertical head, etc.

GISHOLT MACHINE COMPANY, *Madison 10, Wisconsin*

TURRET LATHES • AUTOMATIC LATHES • BALANCERS • SUPERFINISHERS • SPECIAL MACHINES

NIAGARA

The home of America's Most Complete Line of Presses, Shears, Machines and Tools for Sheet Metal Work



This modern Niagara plant is the result of an unbroken record of 72 years of growth and accomplishment under one management . . . that of its founders and their successors trained in the business of designing and building machines superlatively well.

NIAGARA MACHINE & TOOL WORKS · BUFFALO 11, N. Y.

PRODUCTS

famous for Quality
Since 1879

POWER MACHINERY

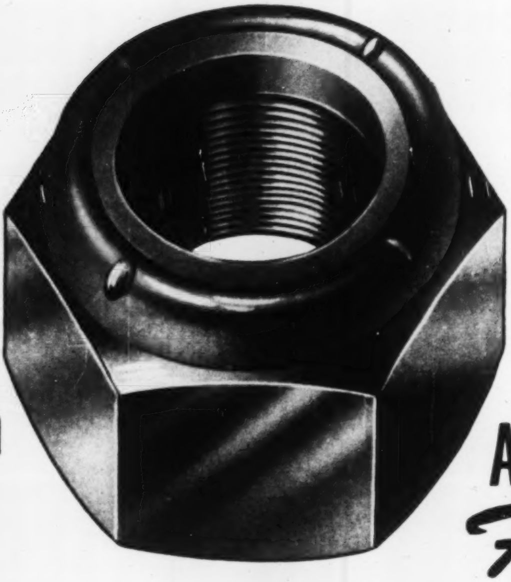
- Mechanical Presses
- Hydraulic Presses
- Squaring Shears
- Rotary Shears
- Flangers
- Slip Roll Formers
- Groovers
- Seamers
- Folders
- Rotary Machines
- Drum Making Equipment
- Electric Automatic Welders

HAND OR FOOT OPERATED MACHINES AND TOOLS

- Squaring Shears
- Rotary Shears
- Bench Shears
- Lever Shears
- Lever Punches
- Slip Roll Formers
- Groovers
- Seamers
- Folders
- Rotary Machines
- Hand Tools

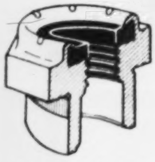
NIAGARA

DISTRICT OFFICES: DETROIT • CLEVELAND • NEW YORK

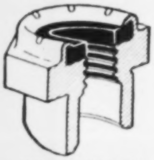


ANCHORED *Forever*

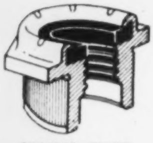
. . . OR RELEASED IN AN INSTANT



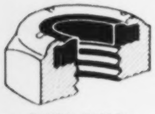
CLINCH TYPE



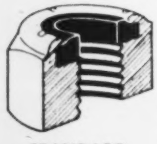
INSTRUMENT MOUNTING



SPLINE TYPE



THIN TYPE



STANDARD

Assembly is simplified . . . fastener failure eliminated. GREER STOP NUTS hold firm against jolts, shocks, shimmy, wobbles . . . any vibration, of any kind. Trustworthy, dependable under severest conditions.

Bolt threads are gripped tightly . . . these famous nuts *never* work loose. Yet an ordinary hand wrench gives instant release. The tough, built-in GREERCOID collar does it . . . and seals against fluid leakage, too!

Consult GREER for complete line. Over 3000 types and sizes. Proved on hundreds of products. Meets government and military specifications.

FOR INFORMATION WRITE:

GREER STOP NUT COMPANY
2618 W. Flournoy Street — Chicago 12, Illinois

GREER STOP NUTS

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In
Every
B-36 Bomber
There Are More Than

30,000
Die Castings

Produced by

DOEHLER-JARVIS CORPORATION

The World's Largest Producer and Finisher of Die Castings

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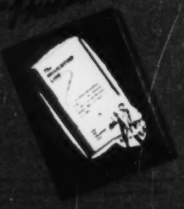
EXECUTIVE OFFICE: 386 FOURTH AVENUE, NEW YORK, N. Y.

How to get the answers to many of your Metalworking Problems

- Call the Houghton Man—if you're having heat *treating* difficulties—can't get required physicals from today's lean alloy steels, troubles with deformation or cracking in complex heat treated parts, improper hardness depth.
- Call the Houghton Man—if you are having trouble in *machining*—poor finishes or tool life, production too low, costs too high.
- Call the Houghton Man—if *rust* is your bugaboo—on finished parts, between operations or in shipment.
- Call the Houghton Man—if you're seeking a more efficient *cleaner*—one which will give you better results faster, at lower unit cost.
- Call the Houghton Man—often he can give you help right on the spot.
- Call the Houghton Man—he represents a company with more than 85 years' experience in solving metalworking problems—a company with the technical "know-how" and research facilities to find the answers to your problems—a company interested in solving your problems.

Write for "Product Guide" Bulletin



E. F. HOUGHTON & CO.
PHILADELPHIA · CHICAGO · DETROIT · SAN FRANCISCO

Ready to give you on-the-job service . . .

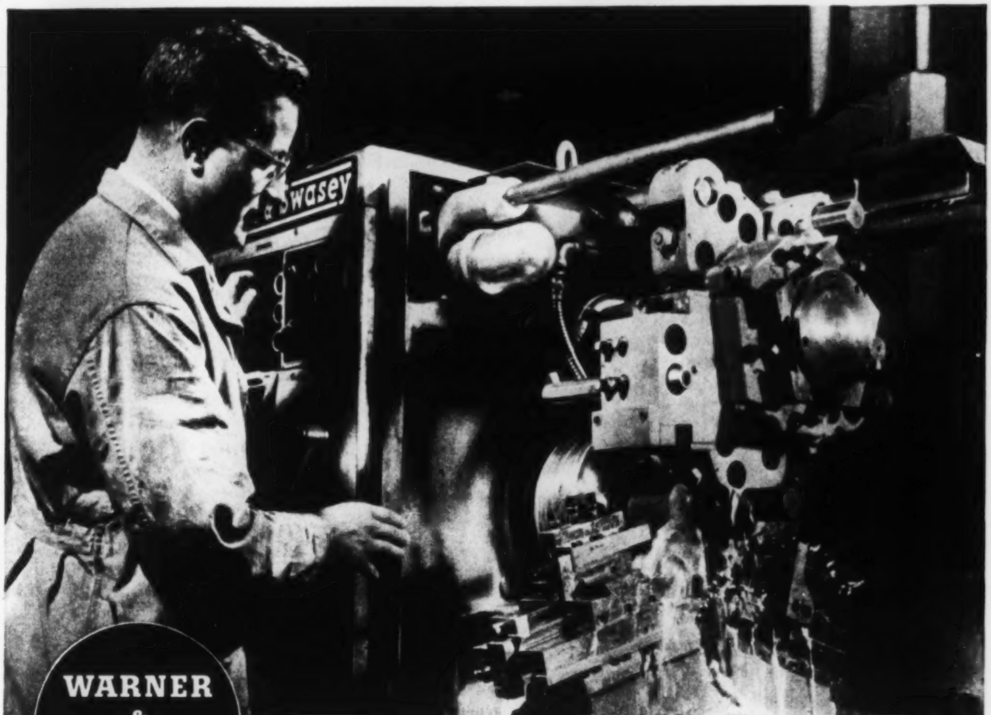
An especially important story today...

PRODUCTION UP 220%—YET WITH FEWER OPERATORS!

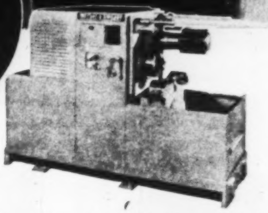
● Take a look at the record of Warner & Swasey 1-AC Single Spindle Automatic Chucking Machines, used at The Cooper Alloy Foundry Co., to machine Cast Type 316 Chromium-nickel stainless steel Valve Nuts. These automatic machines increased production 220%, reduced floor-to-floor time 69%, turned out more uniform parts, substantially cut costs per part. Yet they required no additional setup time.

In today's tight manpower market the 1-AC Automatic is taking on increasing importance to management. One man can handle two machines—with each machine turning out substantially more production than an individually-manned, hand-operated machine.

Certain types of machining jobs in your plant can undoubtedly be done better, faster, more profitably—and with less manpower—with the 1-AC Automatic. To find out just how the 1-AC fits into your production setup, call in your nearest Warner & Swasey Field Representative, or write The Warner & Swasey Company, 5701 Carnegie Ave., Cleveland 3, Ohio.



WARNER
&
SWASEY
Cleveland



Warner & Swasey 1-AC Automatic Chucking Machine used at THE COOPER ALLOY FDY. CO., *Stainless Engineering & Machine Works Division, Hillside, New Jersey.*

YOU CAN MACHINE IT BETTER, FASTER, FOR LESS WITH WARNER & SWASEY TURRET LATHES, AUTOMATICS AND TAPPING MACHINES

LINDE'S News of Metalworking

Sigma Welding...

A Process with Outstanding Promise

Recently, the country's biggest tank car manufacturer received the largest order for aluminum tank cars ever issued — ninety-eight tank cars on a single order. This order was obtained only because of the development of a fully automatic welding process . . . shielded inert gas metal arc welding — sigma welding.

This welding process has made double-vee butt welds at 5 in. per min. in 1-in. material. Structural welds have been made at 48 in. per min. in ¼ in. plate, and as high as 200 in. per min. on 1/16 in. material.

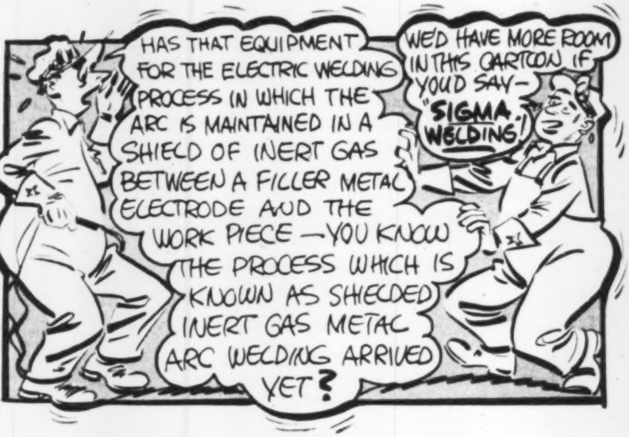
Prior to the development of sigma welding, fabricating aluminum tank cars was a slow hand process. In order to weld the heavy plates used in making the cars, as many as six passes were required.

With an automatic sigma welding setup, X-ray quality welds in the ½ to 1¼ in. thick aluminum plates are made at speeds of from 6 to 15 in. per minute. And only 2 passes, one inside and one outside, are required to get perfect penetration. High current densities used in sigma welding result in narrow welds with deep penetration.

Sigma welding is fast becoming an important fusion welding method. It has not only replaced many other welding methods, but has permitted fabrications hitherto impracticable for welding.

Just recently, a metalworker adopted this process for welding an aluminum-bronze valve seat to a mild steel tube . . . sigma welding proved to be the only practical method he could use for this work.

Another shop built their first *aluminum tank using sigma welding* . . . The large tank was finished so quickly — work progressed without stopping — that the shop will replace all other welding methods with sigma welding. Excellent welds *requiring little finishing* were obtained in the ½ in. aluminum plates.


HAS THAT EQUIPMENT FOR THE ELECTRIC WELDING PROCESS IN WHICH THE ARC IS MAINTAINED IN A SHIELD OF INERT GAS BETWEEN A FILLER METAL ELECTRODE AND THE WORK PIECE — YOU KNOW THE PROCESS WHICH IS KNOWN AS SHIELDED INERT GAS METAL ARC WELDING ARRIVED YET?
WE'D HAVE MORE ROOM IN THIS CARTOON IF YOU'D SAY— "SIGMA WELDING!"

New Processes Need New Names

The cartoon shows just about the way it started . . . Shielded inert gas metal arc welding was quite a mouthful to say when describing or referring to the process. It also required a lot of space in written material.

Then someone said sigma welding. It was easier to say.

Sigma is a good word, too. Each of the letters is an initial letter of the words: shielded, inert, gas, metal, and arc.

This easy-to-say word, sigma, is now used to describe the process. It is not a trade-marked word, and is used in the same sense as oxy-acetylene welding, gas cutting, or brown dog — just like any other descriptive adjective.

Metals Being Joined by Sigma Welding

Sigma welding can be used on practically all commercial metals. Railroad tank cars, chemical and food processing tanks, pressure vessels, and brewery equipment are only a few applications where the process is being used economically. Here's a quick look at some of the metals being joined by this process:

Aluminum . . . All weldable grades including 3-S, 50-S (150-S), 52-S, 61-S, and the commercially pure 2-S alloy are being welded with excellent results . . . These alloys are being machine welded in thicknesses ranging from 0.50 in. to 1.50 inch . . . Hand welds are made in material ⅛ in. and thicker . . . Maximum thickness that can be welded is unlimited with multi-pass technique . . .

Stainless Steel . . . Sound X-ray quality butt welds have been obtained in thicknesses ranging from ⅛ to ½ inch . . . Quite evident that heavier thicknesses can be welded . . . Results of tests show that welds possess good tensile strength, elongation, and impact resistance . . .

Copper . . . Sound butt, fillet, and corner welds have been made in ⅛ in. and ¼ in. deoxidized copper.

Everdur . . . Butt welds made in ⅛, ¼, and ½ in. thick materials are sound, smooth, and without cracks or undercutting. Tests showed that bend and tensile specimens have excellent properties.

Carbon Steel . . . Sound machine butt welds have been made in ⅛ in., ¼ in., and ½ in. thick killed and semi-killed carbon steels . . .

Aluminum Bronze rod has been deposited on mild steel with excellent results . . . Wear resistance greatly improved . . . Other surfacing and buildup operations very successful . . .

LINDE'S Apparatus for Sigma Welding

Here is LINDE's sigma apparatus for either machine or hand-welding. It provides automatic operation, accurate and uniform control of rate of rod feed, easy handling, and simplicity of operation . . . Everything to help you make X ray quality welds at high speeds.

Hand Torch Designed for Easy Handling

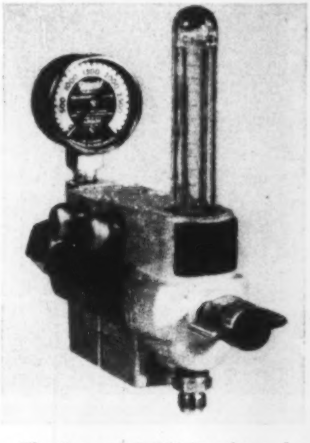
The LINDE HW-11 Torch is designed for sigma hand-welding. It is lightweight, and pistol-shaped to provide a convenient grip and easy handling. The gas cup and torch power cable are water-cooled for protection from overheating. All hoses to the torch are bound together in a synthetic rubber sheath which is highly flexible.

The rated capacity of the torch is 400 amp. when cooling water flow is 1 qt. per min. at inlet temp. of 60 deg. Fahrenheit.

Simple Assembly Controls Rod Feed

LINDE's Rod Feed and Control Assembly for hand-welding, automatically controls rod feed at all times. Rod is fed at a constant predetermined speed which is regulated by an electronic governor. Rate of rod feed depends on the current and material being welded, and can be easily adjusted by a potentiometer. A rough initial setting for the potentiometer is determined from welding data tables. After the arc is struck, the operator can adjust the potentiometer, if necessary, to get a steady, smooth arc. Welding is then done without any further adjustments.

Argon Regulator Assures Uniform Gas Flow

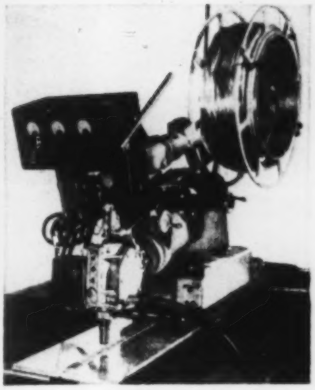


The OXWELD R-502 Regulator, designed specifically for inert gas welding, reduces the pressure of the argon stored in the cylinder to the working pressure needed. One simple setting adjusts it to supply the torch with the correct rate of argon flow required for the work at hand. A built-in flowmeter and throttle valve always show the flow of argon used. The indication is always true, and is not affected by the pressure drop between the valve and the working end of the torch.

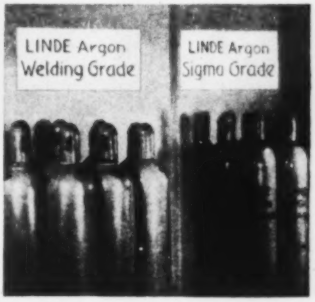
Machine Welds Made at High-Speed with the FSM-1

LINDE's FSM-1 machine makes clean, smooth welds. Welding is fast and weld quality high. Almost any metal thickness can be welded by a suitable number of passes.

The FSM-1 is recommended for welding long seams, or for work that is fairly repetitive. The welding head can be positioned for practically any work requirement. It has provisions for vertical and lateral adjustments in two planes for the angle at which the welding rod is fed into the weld zone. Retract starting provides for starting the arc quickly and conveniently.



LINDE Argon (99.92% pure), and Sigma Grade



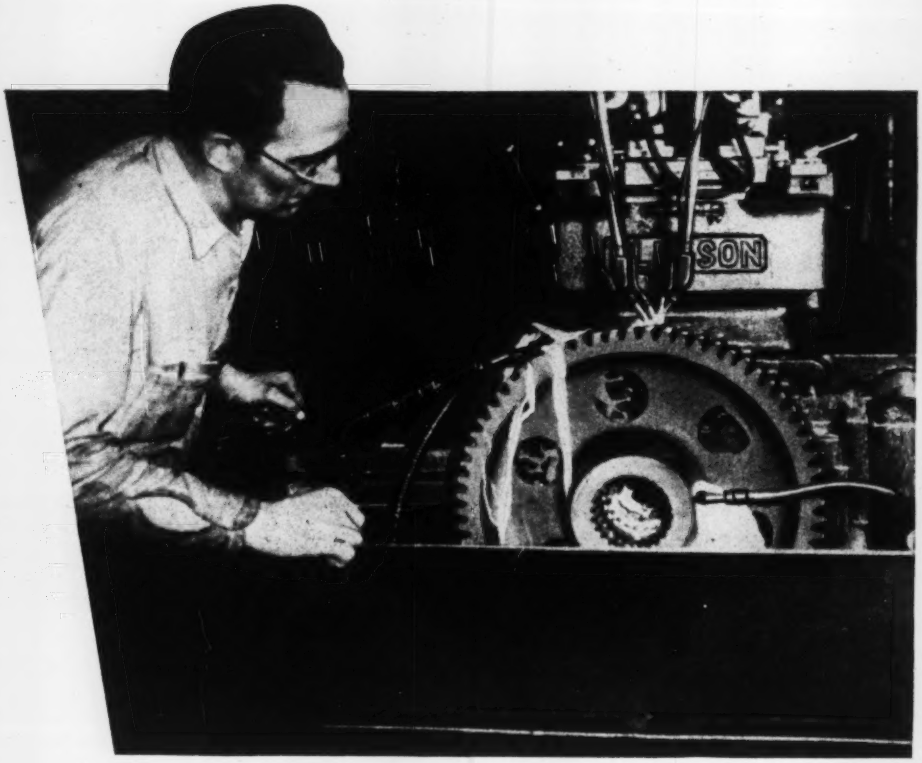
For welding stainless and carbon steels, LINDE argon — sigma grade, a mixture of oxygen in argon, speeds metal deposition. It permits welding at high speeds without undercutting, improves coalescence of the weld metal, and makes overhead welding of stainless steel practicable.

For those metals requiring a pure argon gas, LINDE offers standard welding argon that is 99.92 per cent pure. This high purity makes it the best all-around shielding gas.

For further information about LINDE's equipment for sigma welding, please contact any LINDE office.

The terms "Linde" and "Oxweld" are registered trade-marks of Union Carbide and Carbon Corporation.

LINDE AIR PRODUCTS COMPANY
A DIVISION OF UNION CARBIDE
AND CARBON CORPORATION
30 East 42nd Street New York 17, N. Y.
Offices in Other Principal Cities
In Canada:
Dominion Oxygen Company, Limited, Toronto



flame-hardening ✦ ✦ ✦

. . . a process for hardening ferrous metal surfaces. It permits the hardening of gear teeth, thus increasing wearability, while the gear body's ductility, toughness and resistance to impact are undisturbed.

- At BRAD FOOTE, flame-hardening, and every other operation from design to shipment of finished gears, is done in our own plant—by our own skilled workers. No one shares our responsibility.
- When you order BRAD FOOTE gears, you know for sure they will give long, satisfactory service in your shop—or on the equipment you sell to others. BRAD FOOTE makes gears . . . good gears . . . for a world at work—or at war.

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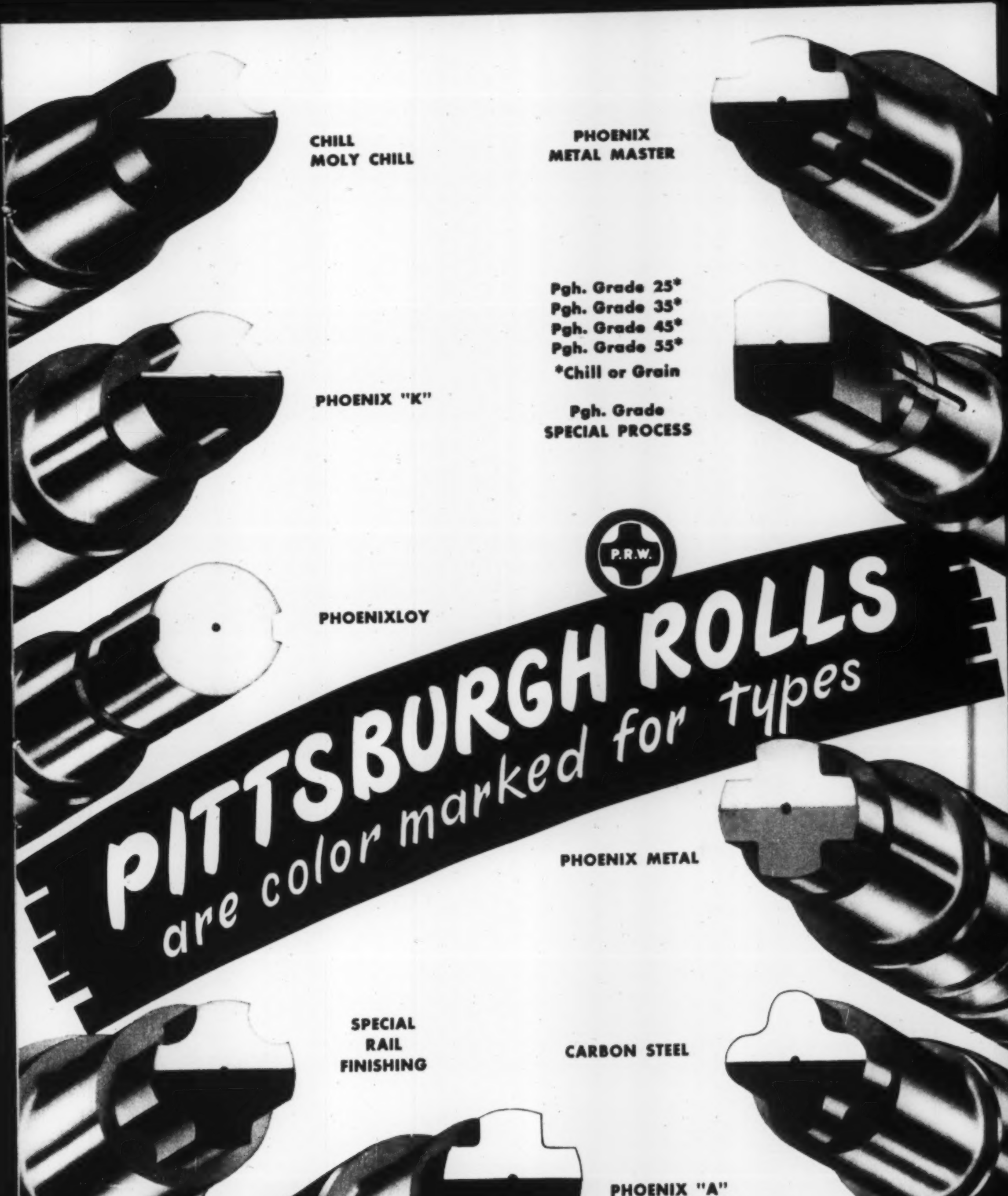

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METAL MASTER

Pgh. Grade 25*
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SPECIAL PROCESS

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PITTSBURGH ROLLS
are color marked for types

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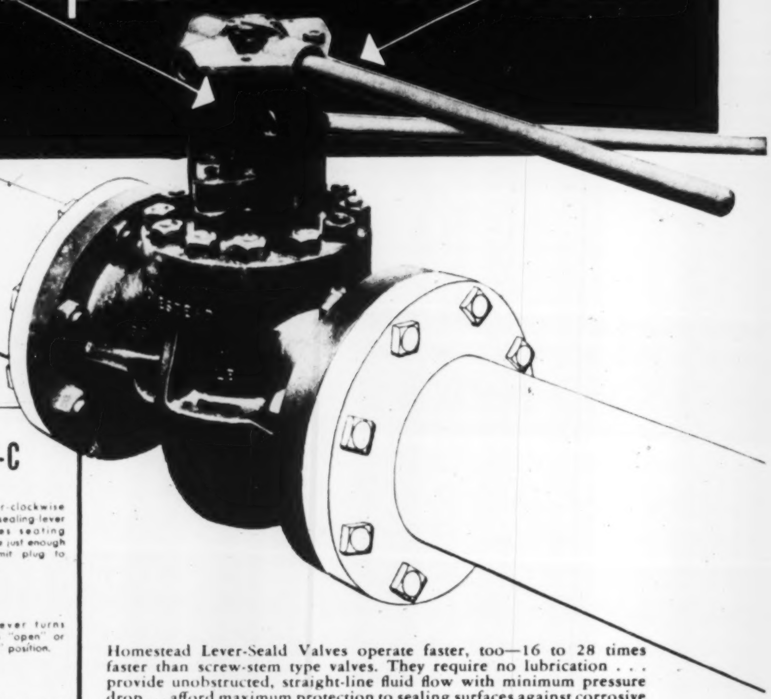
PITTSBURGH ROLLS DIVISION of BLAW-KNOX COMPANY • PITTSBURGH, PA.

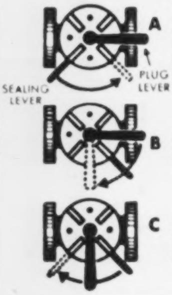
- at all times
- under all conditions
- throughout its long lifetime of service

This Homestead Valve will always work

it's stickproof because it's lever-seald



Simple as A-B-C



A Counter-clockwise turn of sealing-lever relieves seating pressure just enough to permit plug to turn.

B Plug lever turns plug to "open" or "closed" position.

C Clockwise turn of sealing-lever restores full seating pressure.

Homestead Lever-Seald Valves operate faster, too—16 to 28 times faster than screw-stem type valves. They require no lubrication . . . provide unobstructed, straight-line fluid flow with minimum pressure drop . . . afford maximum protection to sealing surfaces against corrosive and erosive line fluids. And because only a quarter-turn is needed for full opening or closing, they are ideal for installation in restricted areas where operation of other types of valves might be difficult.

Next time you have damaged or sticking valves, replace them with Homestead Lever-Seald Plug Valves. Once you use them you'll never be satisfied with ordinary valves.

For complete information write for Valve Reference Book No. 39-3.

HOMESTEAD LEVER-SEALD PLUG VALVES

HOMESTEAD VALVE MANUFACTURING COMPANY
Serving since 1892

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for a
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Flat Tempered and Untempered Wire in .50 to 1.25 Carbon Range.

Flat Cold Rolled Strip 6" and Narrower, Bright, Galvanized, Tinned and Cadmium Finish.

Round Untempered Low and High Carbon Spring Wires.

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WASHBURN

CLEAN, UNIFORM BILLETS—STRIP—RECTANGULAR, ROUND, FLAT RODS
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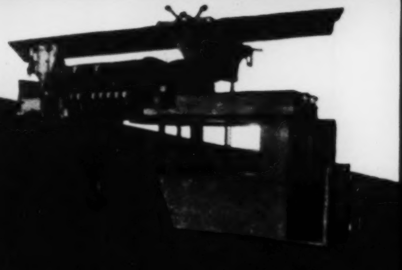

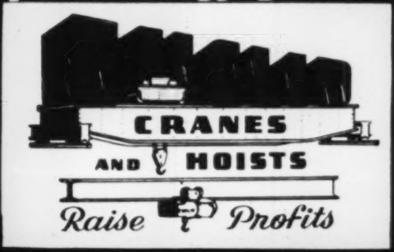

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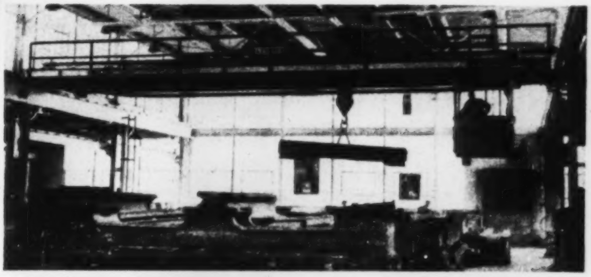
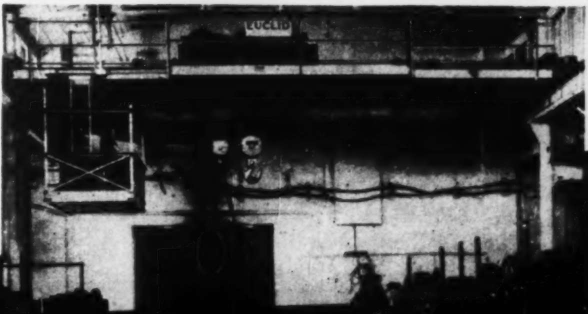
Your most searching investigation of Euclid cranes and hoists is invited as to types, construction, serviceability, performance and character of users.

You are entitled to have all these facts before making the sizable outlay involved in the purchase of these capital goods items.

We believe you'll be impressed by the character of our purchasers—our record of repeat orders—and the excellence of design and construction which are basic factors in their success.





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Submit specifications for prices and recommendations.

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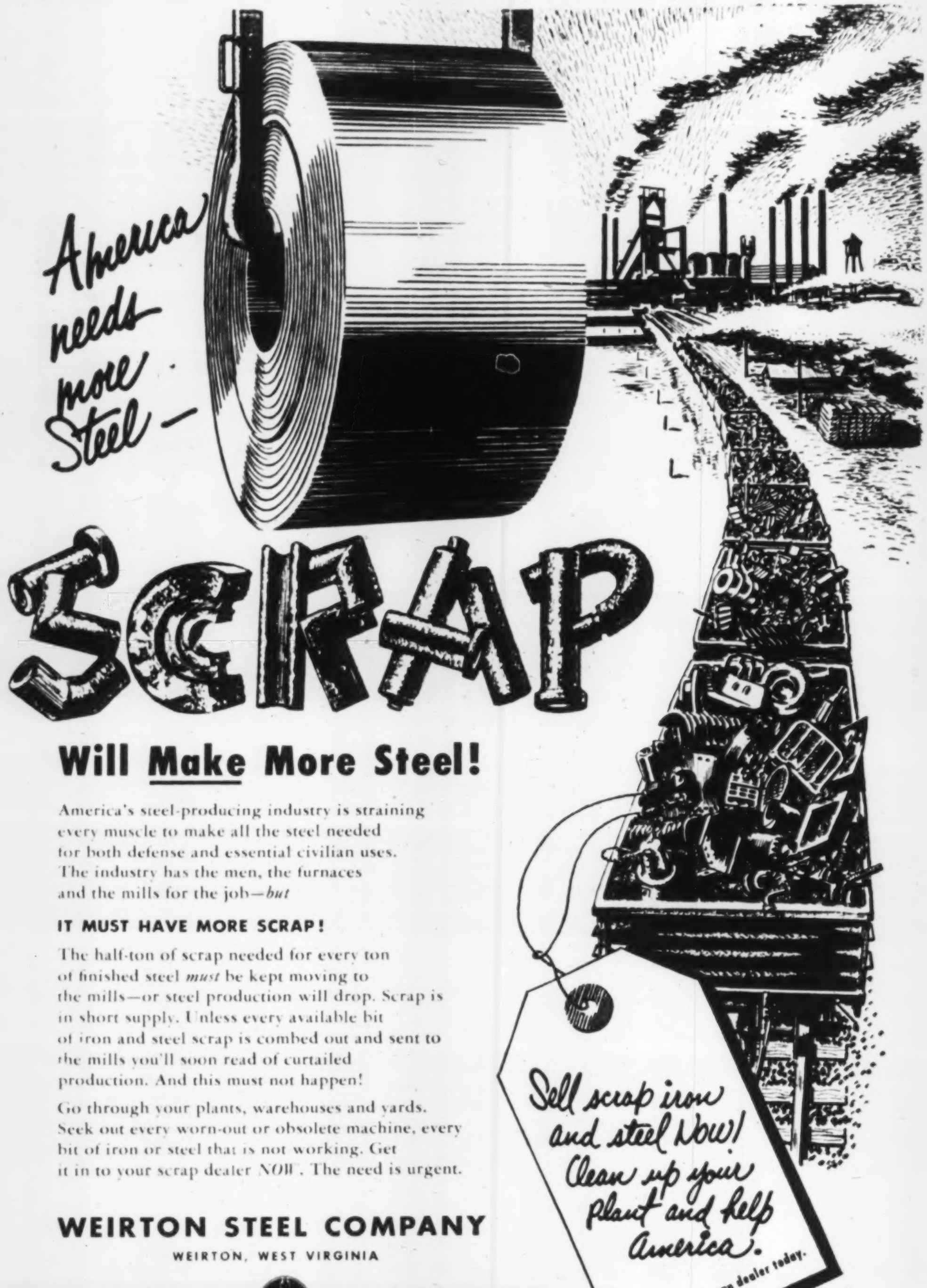
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SCRAP
Sell scrap iron and steel Now! Clean up your plant and help America.
Call your local scrap dealer today.

Will Make More Steel!

America's steel-producing industry is straining every muscle to make all the steel needed for both defense and essential civilian uses. The industry has the men, the furnaces and the mills for the job—*but*

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The half-ton of scrap needed for every ton of finished steel *must* be kept moving to the mills—or steel production will drop. Scrap is in short supply. Unless every available bit of iron and steel scrap is combed out and sent to the mills you'll soon read of curtailed production. And this must not happen!

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Save 68%

OF DOCK HANDLING TIME*

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* "A U. S. Navy Materials Handling Laboratory estimates that mechanized handling can cut 68% of the man hours needed for loading freight cars."

A "twist of the wrist" does it.

One user of 8 Moto-Truc Walkies, reduced the man hours unloading a boxcar from 16 to 4. Viz:—One man with a Moto-Truc Pallet now does in 4 hours what formerly took 2 men 8 hours with former methods.

Exclusive Braking System

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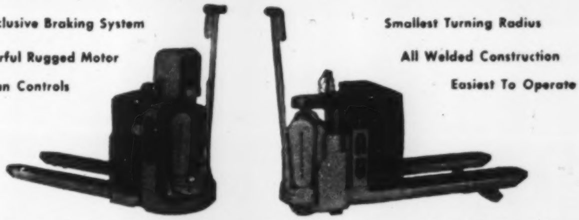
Easiest To Operate



MOTO-TRUC'S 6 BASIC MODELS ARE QUICKLY ADAPTABLE TO ANY PROBLEM IN THE WALKIE FIELD.

DON'T BE SATISFIED WITH LESS THAN THE BEST.

THE MOTO-TRUC CO.

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PALLET, PLATFORM AND HI-LIFT TRUCKS

LARGEST EXCLUSIVE MANUFACTURER OF "WALKIES"

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FOUNDRY CO.
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DROP FORGINGS *Flying Faster Than Sound*
Demand Hammers of UTMOST PRECISION

ERIE HAMMERS . . . steam drop, board drop, double and single frame forging, air and pneumatic . . . products of over 50 years design and building "know how" . . . These meet the highly specialized demands for modern jet airplane engine forged components. Experienced hammer gangs using Erie Hammers turn out turbo jet parts of exactly the desired shape and tolerance, and improve the physical properties of the metal *in the exact degree specified.* Perfect die alignment is maintained at all times in Erie Hammers. Sensitivity of control . . . Power in the exact degree to meet physical property specifications . . . These qualities in Erie Hammers contribute vastly to perfect turbo super charger forgings. All parts in Erie Hammers subject to impact anvils, frames, upper works are steel.

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Veelos—*the Adjustable V-Belt*

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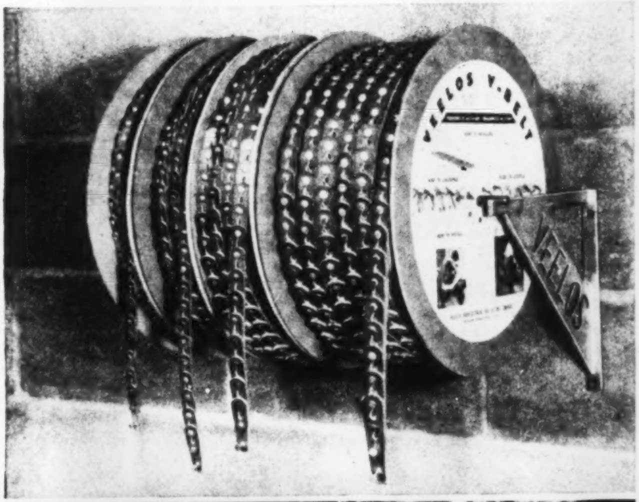

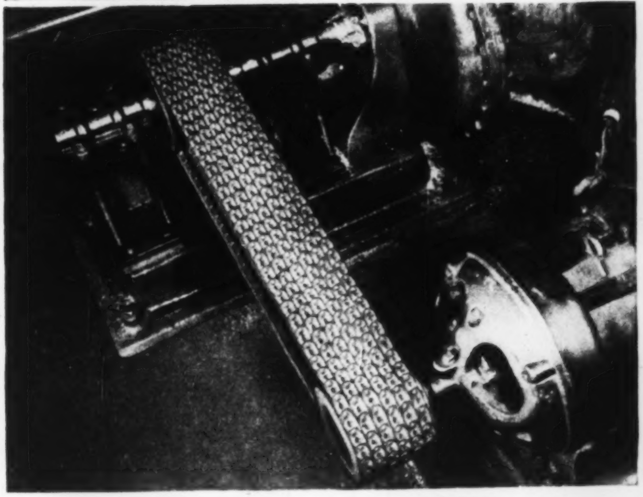

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Veelos pays for itself by reducing required v-belt stocks. Just 4 reels of Veelos cover *every* v-belt need (up to 316 sizes) in the O, A, B and C widths. Stock only one reel for each width of belt you use—and *any length is readily available.*

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Veelos pays for itself because it can be installed quickly and easily without dismantling outboard bearings or moving motor. Individual belts can be adjusted by simply removing or adding links.

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Veelos pays for itself because uniform tension can be maintained on all belts to provide vibrationless, full power delivery. Simple adjustment of each belt means that *matched sets stay matched.*

Write for your copy of the Veelos Data Book. It gives the complete story on why Veelos pays for itself.

MANHEIM MANUFACTURING & BELTING COMPANY
Manheim, Pennsylvania

VEELOS
THE LINK
V-BELT

ADJUSTABLE TO ANY LENGTH • ADAPTABLE TO ANY DRIVE

Made in all widths in three types; regular, oil-proof and static conducting. Also double V in A and B. Packaged on reels in 100-foot lengths. Sales engineers in principal cities; over 350 distributors throughout the country. Veelos is known as VEELINK outside the United States.

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600 series a better bearing bronze containing no hard-to-get tin

If you use gears, connecting rods or other parts of bearing metal in your products, it will pay you to investigate Mueller Brass Co. "600" series, a forgeable bronze that contains no critical tin. This bearing metal outperforms phosphor bronze and other bearing metals and will save you money in your applications. "600" series bearing metal can be forged into relatively complicated shapes and produces a forging of close-grained homogeneous structure impossible to get in a casting. The forged shape is closer to finished size than a casting and requires less machining. "600" series alloys have a low coefficient of friction, a tensile strength 2½ times greater than cast phosphor bronzes and a high resistance to corrosion. "600" has a 25 year record of outstanding performance on some of the toughest bearing applications. There is a "600" series alloy with the properties to fit your bearing metal needs . . . write today for further facts.

Four typical parts forged from Mueller Brass Co. "600" series Bearing Bronze.

MUELLER BRASS CO.

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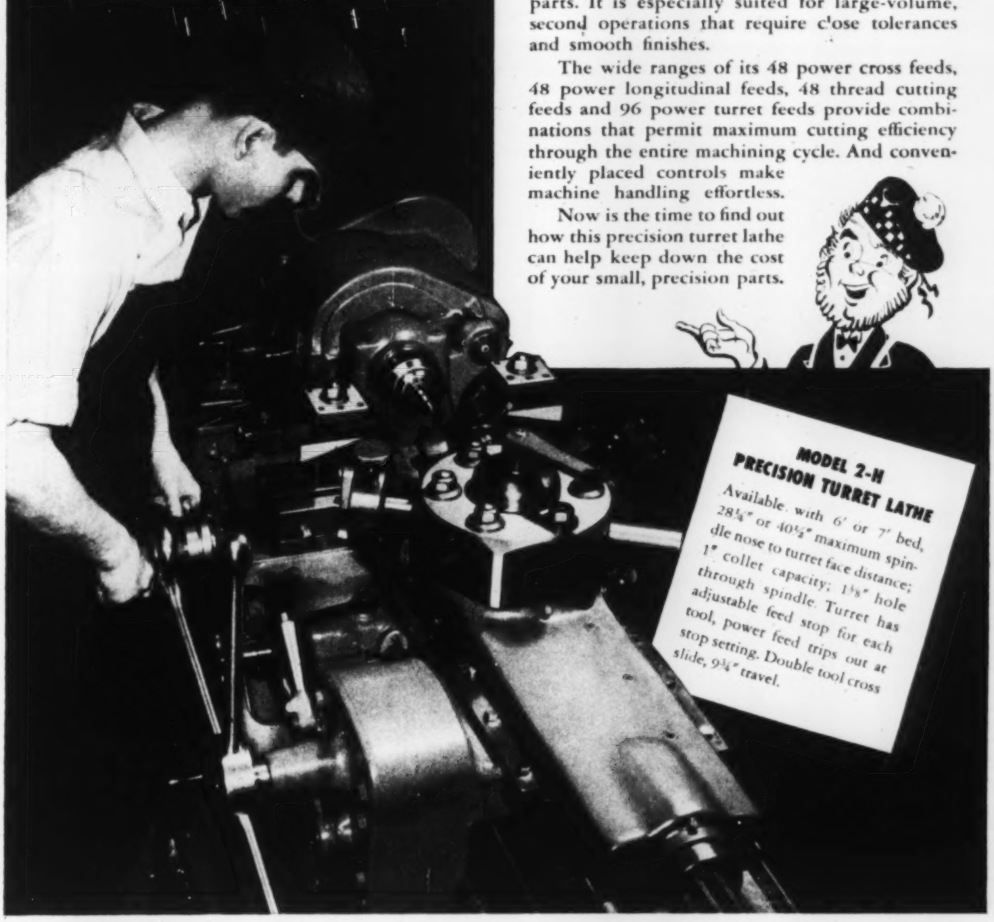
SOUTH BEND 2-H TURRET LATHE

Keeps Costs Down on Precision Parts

This precision-built turret lathe is designed specifically for the machining of accurate, duplicate parts. It is especially suited for large-volume, second operations that require close tolerances and smooth finishes.

The wide ranges of its 48 power cross feeds, 48 power longitudinal feeds, 48 thread cutting feeds and 96 power turret feeds provide combinations that permit maximum cutting efficiency through the entire machining cycle. And conveniently placed controls make machine handling effortless.

Now is the time to find out how this precision turret lathe can help keep down the cost of your small, precision parts.



MODEL 2-H PRECISION TURRET LATHE

Available with 6′ or 7′ bed, 28¾″ or 40½″ maximum spindle nose to turret face distance; 1″ collet capacity; 1⅜″ hole through spindle. Turret has adjustable feed stop for each tool, power feed trips out at stop setting. Double tool cross slide, 9¾″ travel.

SEND INFORMATION CHECKED:

☐ ____________

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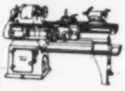
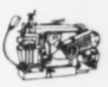
☐ 9″ and 10″ BENCH LATHES



☐ 10″ to 16-24″ FLOOR LATHES

☐ ½″ and 1″ Collet TURRET LATHES

☐ 14″ DRILL PRESSES



☐ 7″ BENCH SHAPERS

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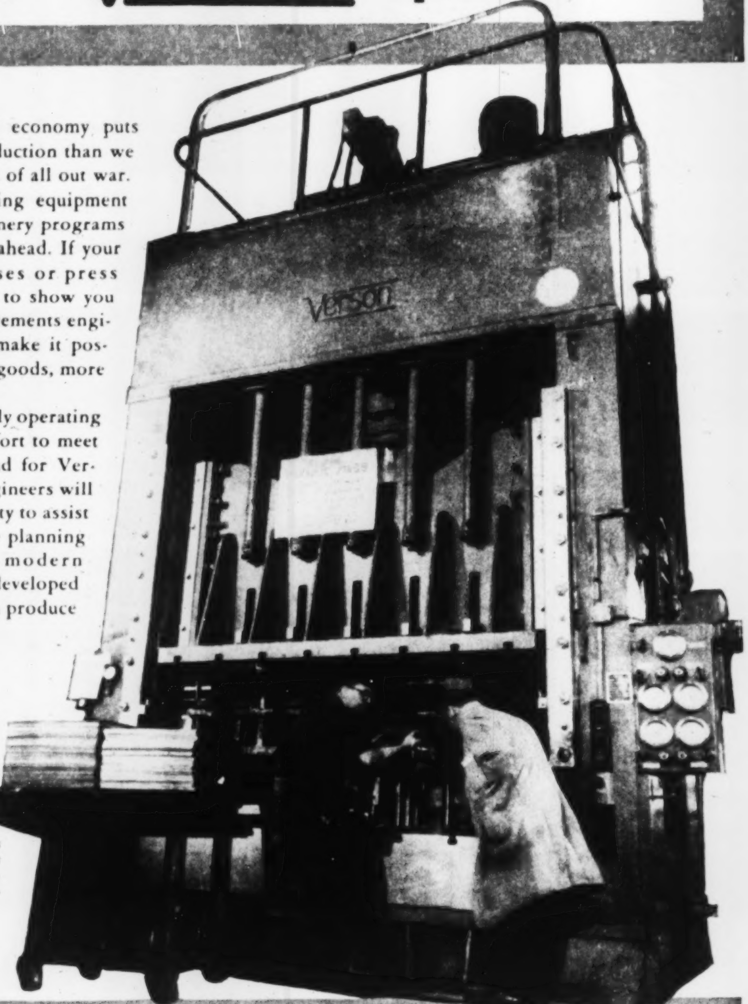
Building Better Tools Since 1906 • **SOUTH BEND LATHE** • South Bend 22, Indiana

Produce MORE Defense goods at LOWER costs with TRADE Verson MARK presses

A "guns and butter" economy puts more pressure on production than we have ever known short of all out war. But with metal working equipment in short supply, machinery programs must be planned well ahead. If your needs include presses or press brakes, we would like to show you the many recent advancements engineered by Verson to make it possible to produce more goods, more efficiently.

While we are presently operating night and day in an effort to meet the tremendous demand for Verson equipment, our engineers will welcome the opportunity to assist you in your long range planning and show you how modern stamping techniques developed by Verson can help you produce more efficiently.



800 ton Verson Hydraulic press used by Stolper Steel Products Corp., Milwaukee, to form military gasoline cans. (Photo Courtesy Milwaukee Sentinel.)

Originators and Pioneers of Allsteel Stamping Press Construction

VERSON ALLSTEEL PRESS COMPANY

9318 South Kenwood Avenue, Chicago 19, Illinois

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A VERSON PRESS FOR EVERY JOB FROM 60 TONS UP

MECHANICAL AND HYDRAULIC PRESSES AND PRESS BRAKES • TRANSMAT PRESSES • TOOLING
DIE CUSHIONS • COMPRESSION AND TRANSFER MOLDING PRESSES

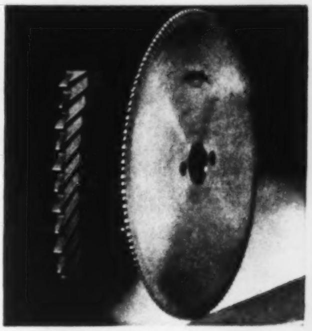
Why run around in circles—to find the Right Circular Saw?

…when SIMONDS makes 'em all!

SIMONDS MAKES ALL THREE TYPES OF CIRCULAR METAL CUTTING SAWS. So you can be sure that SIMONDS will give you *the right saw for your job . . .* for any type of machine. See your Simonds Distributor *today.*

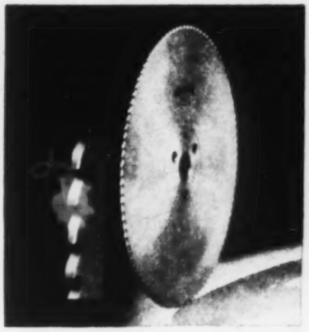
INSERTED TOOTH

For heavy production cutting, Simonds I. T. Saws are tops. Alternating square and beveled teeth "tri-vide" chips for easy cutting and clearance. An individual wedge securely anchors and aligns each tooth in the tough saw plate. What's more, this saw has maximum clearance for cool, free cutting . . . will stand an extremely high rate of feed . . . and teeth can easily be replaced singly or in complete sets right in your own plant by anyone of average mechanical ability.



SEGMENTAL

Where you require a finer tooth saw or especially smooth cuts on production work, *this is your saw.* Long-lived high-speed steel toothed segments are securely held in a tough alloy steel plate by a special tongue and groove design. Teeth are alternately square and beveled for easy cutting and clearance of "tri-vided" chips. Simonds special grinding provides ample clearance directly below the cutting points, insuring free, cool operation under all conditions. Sharpening can be done on any automatic grinder.



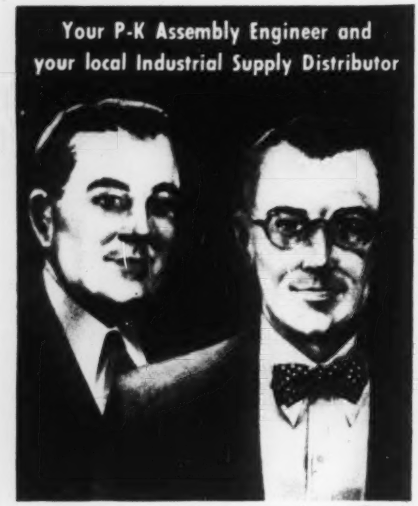
SOLID TOOTH

Clearance ground and furnished in High Speed, Si-Maloy (Patented), or Semi-High Speed Steel, Simonds Solid Tooth Saws are recommended for general shop cut-off requirements, for use on smaller automatic cut-off machines and for cutting operations where kerf is an important factor. Tooth design is determined by and especially suited for the application. Simonds' own steel, plus skilful heat treating and accurate grinding, insure long, dependable, trouble-free service.

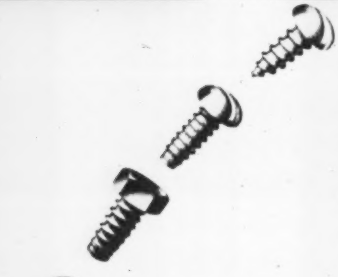
DOWN CUT
UP CUT
FORWARD CUT

SIMONDS
SAW AND STEEL CO.

Factory Branches in Boston, Chicago, San Francisco, and Portland, Ore. Canadian Factory in Montreal, Que.


Your P-K Assembly Engineer and your local Industrial Supply Distributor

Teamed up to help you step up assemblies



Working side by side in every industrial center throughout the nation, this pair of experts is solving many difficult problems of planning and procurement.

The P-K Assembly Engineer is a fastening expert, fully qualified to help you plan faster, better, lower cost assemblies.

Your local Industrial Supply Distributor is an expert in procurement, with complete experience and facilities for simplifying your supply problems.

They can show you why Parker-Kalon Fastening Devices have made record savings in assembly time and cost in over a million applications.

Ask this top-notch team to sit in with your production staff. They'll give you the kind of help you need today more than ever. Parker-Kalon Corporation, 200 Varick Street, New York 14.

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The Original **SELF-TAPPING SCREWS**

Cold-forged **SOCKET SCREWS**

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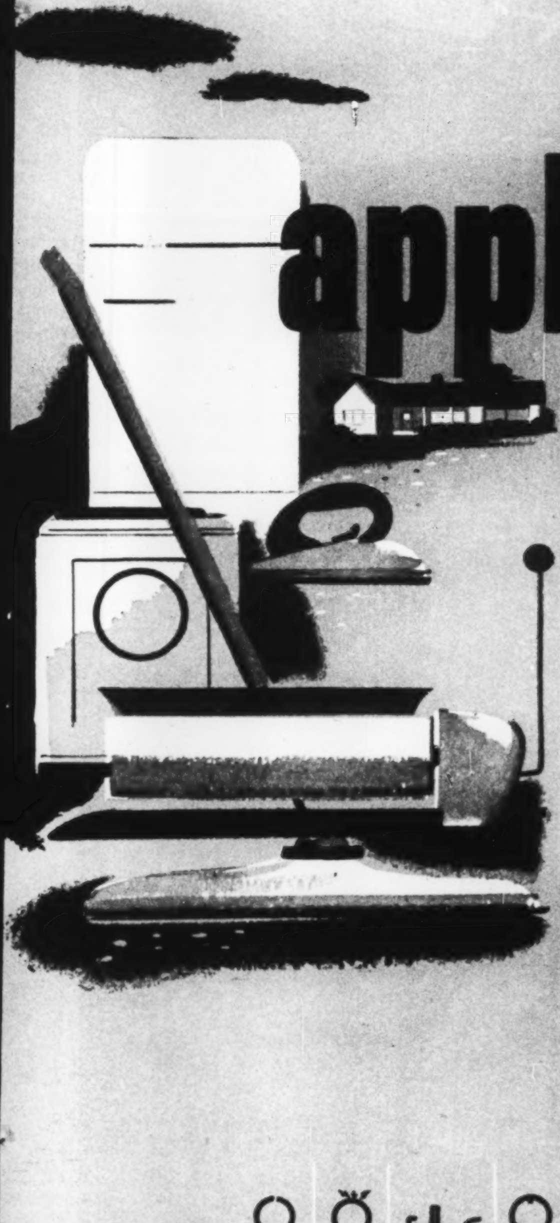
cold-formed metal tubing and shapes
are profitably employed
in hundreds
of

appliances



In the never-ending struggle to free the modern home-maker from drudgery, Van Huffel metal shapes and tubing have made a distinctive contribution. For nearly 50 years, designers of household appliances have been specifying Van Huffel for items that demand strength and style plus fabrication simplicity and economy. Because of Van Huffel's experience and versatility, today's woman can look forward to an even brighter future.

VAN HUFFEL
TUBE CORPORATION • WARREN, OHIO

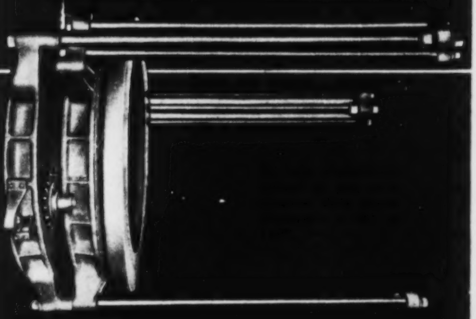
WELDED, LOCK SEAM, OPEN SEAM, BUTTED TUBING, SHAPES AND MOULDINGS

These **dependable** Bailey PRODUCTS

contribute to STEEL MILL SAFETY

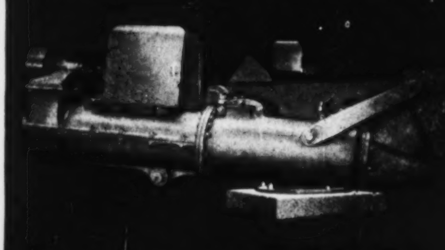
Bailey MECHANICAL VALVES

Noted for their dependable operation under all conditions, Bailey Mechanical Goggle Valves provide a tight, positive seal for shutting off gas mains in emergencies or for repairs. Requiring a minimum of maintenance, they operate by a powerful clamping force which is applied equally at all points around the disc periphery. Regardless of time between operations, they open or close instantly. Sizes from 6″ to 72″, totally enclosed if desired.



Bailey THERMAL VALVES

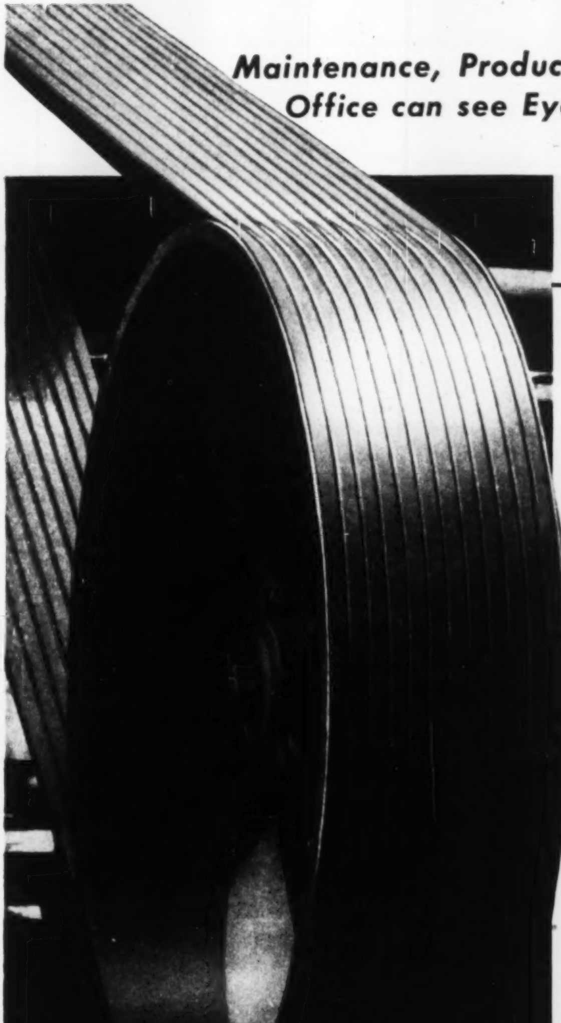
Operated by the lineal expansion and contraction of three sets of tubes spaced around a rigid steel flange, the Bailey Thermal Valve is always safe, dependable and *ready*. When steam is passed through the tubes, thermal expansion creates a powerful force that instantly frees the goggle plate and permits valve operation. When the steam is removed, contraction closes the flanges against the plate, forming a tight seal. Can be operated by hand in case of steam failure.



Bailey CLAY GUN

Powerful electric drive provides the piston pressure necessary to maintain long and uniform tapping holes. Special Bailey Lever Action forces the nose of the gun into position with positive accuracy. Piston is driven by an electric motor through reducing gears. The Bailey Clay Gun is dependable and safe.

1221 BANKSVILLE ROAD PITTSBURGH 16, PA.



Maintenance, Production, Purchasing and Front Office can see Eye to Eye on this "Baby"

It's a TOUGH, LONGER-LASTING BULL DOG V-BELT!

Yes, a Bull Dog V-Belt has something for everybody. Your engineers and production heads who have enough on their minds already with shortages and the necessity for increased output will appreciate the SPECIALLY ENGINEERED BWH CORD SECTION and its high tensile strength. They'll get the superior load carrying capacity from BULL DOGS and the ability to absorb shock loads that's needed.

Your maintenance men (engineers, too) will note the QUALITY CONTROLLED COMPOUNDS developed by BWH which run cooler and do not crack or deteriorate under severe flexing. They'll probably note also the MINIMUM STRETCH — due to a new and exclusive technique in processing Bull Dog Cords. They'll be *sure* to note the less slippage, fewer adjustments, longer belt life that results.

Your maintenance men will also okay the Bull Dog V-Belt's DURABLE COVERS. They're made of closely woven, heavy, bias-cut fabric that takes the torturous wearing action where the belt meets the sheave — seals it against the penetration of dirt, grease and moisture.

With it all adding up to less money *out* in belt repairs and replacements and more money *in* from maintained and increased production . . . don't you think Purchasing and the Front Office will be glad to go along?

BWH
DEPENDABLE RUGGEDNESS

TOUGH PROBLEMS INVITED!

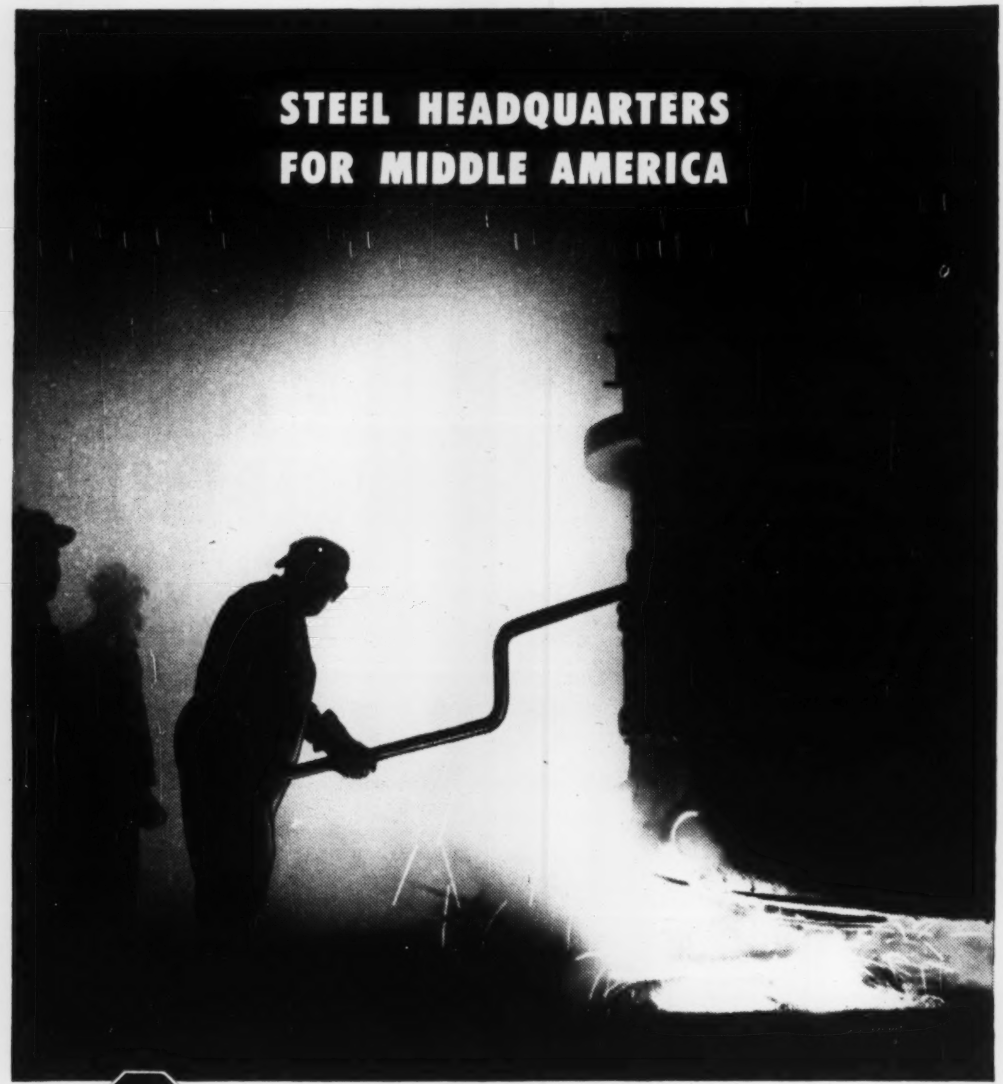
Ask us or your nearest BWH distributor about your power transmission belting, conveyor belting or hose problems. We're specialists in making mechanical rubber products work better, longer.

Another Quality Product of

BOSTON WOVEN HOSE & RUBBER CO.

Distributors in all Principal Cities

PLANT: CAMBRIDGE, MASS. • P. O. BOX 1071, BOSTON 3, MASS., U. S. A.



SINCE
GRANITE CITY STEEL
1878

Middle America, backbone of the nation, gets part of its strength from Granite City Steel's modern mills. Since 1878, Granite City Steel has been the main supplier of quality steel for Middle America. And today we continue to keep pace with Progress . . . continue to be Steel Headquarters for Middle America.

OUR PRODUCTS

Ingots • Cold Rolled Coils • Strongbarn Galvanized Roofing and Siding (Patented) Cold Rolled Sheets • Electrical Sheets Tin Mill Products • Electrolytic Tin Plate Porcelain Enameling Sheets • Fabricated Products • Hi-Strength Corruform

GENERAL OFFICE and PLANT

Granite City, Illinois

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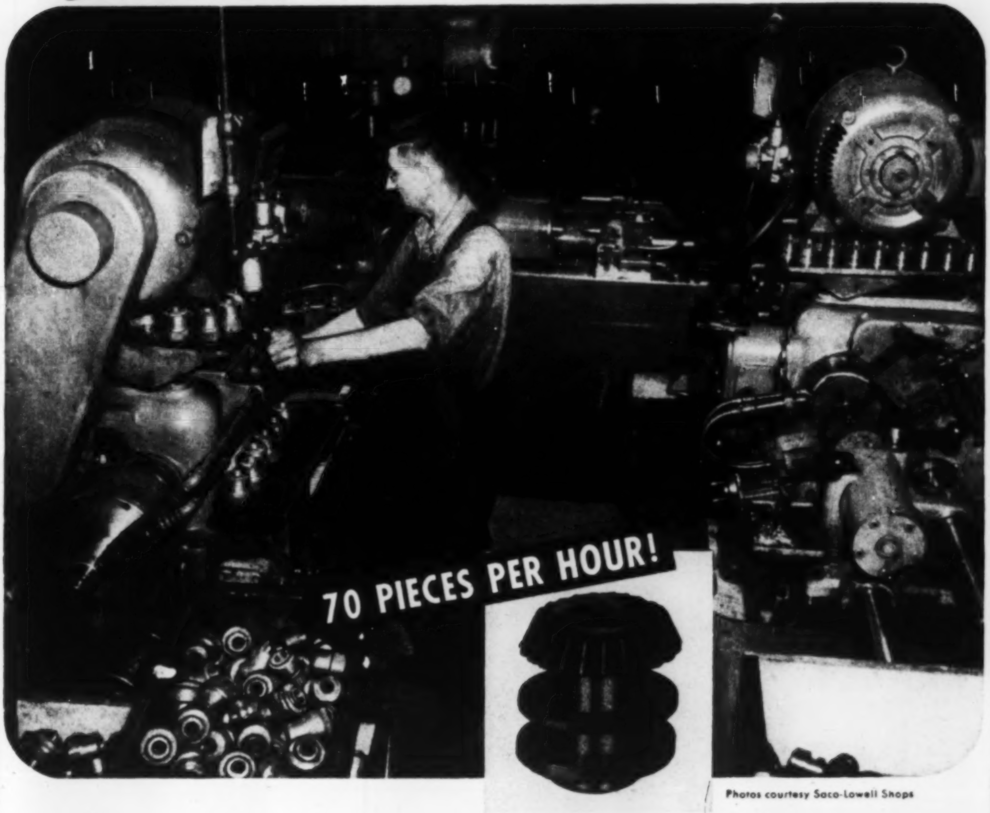
GRANITE CITY STEEL COMPANY, Granite City, Illinois

FACTS on improving production!



Photos courtesy Saco-Lowell Shops

Saco-Lowell Shops, prominent builders of up-to-the-minute textile machinery, solved a production problem by using Jones & Lamson Fay Automatic Lathes to machine bobbin gear blanks. These meehanite castings are completely turned, formed and bored at the rate of 70 pieces per hour on three 8" Fay Automatic Lathes.

THESE LATHES ENABLE A SINGLE OPERATOR TO MEET THE REQUIRED PRODUCTION RATES.

Now, more than ever, the most efficient machines and methods are needed to make the most of your available manpower and material. Jones & Lamson is ready, willing and able to help you get maximum results from your turning, threading and inspection operations. Write *today* to Department 710

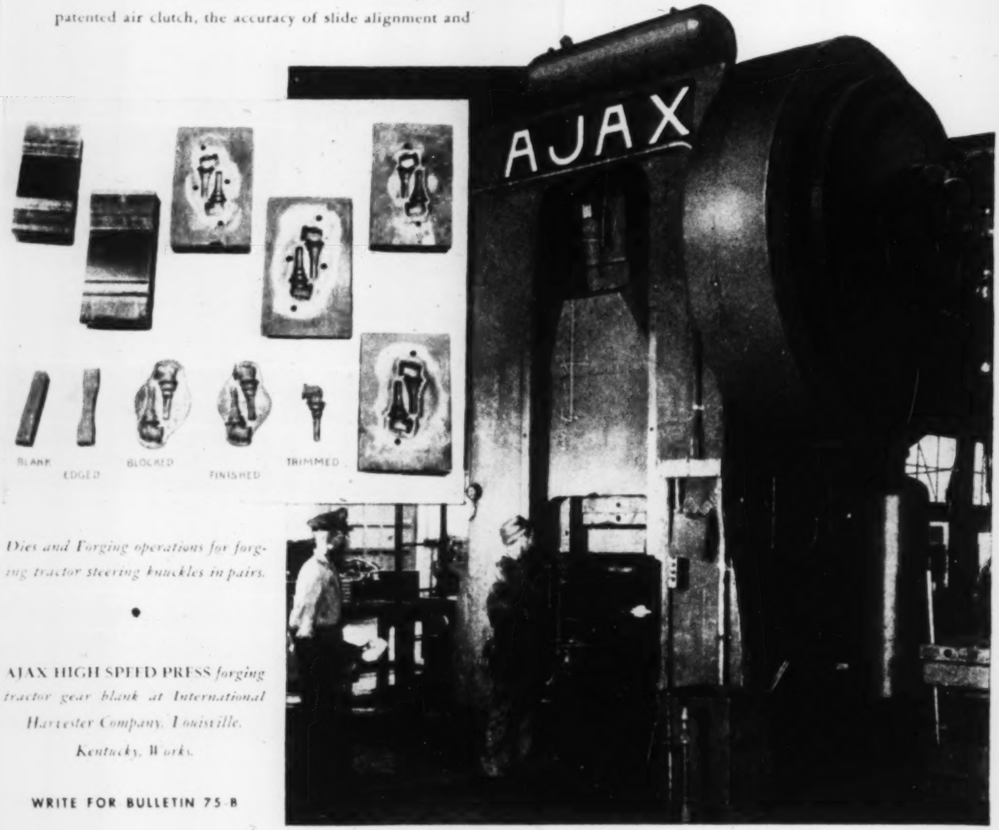
Turret Lathes—Fay Automatic Lathes—Thread Grinders—Optical Comparators—Threading Dies

JONES & LAMSON
MACHINE COMPANY
Springfield, Vermont, U.S.A.

Machine Tool Craftsmen Since 1835

A HEAVY PRESS *makes Light Work of Impression Die Forging*

Ajax Solid Frame Forging Presses are engineered and built to produce impression die forgings of highest quality at new high rates of production and at a minimum cost. The great rigidity of the solid steel frame, the instantaneous response to the treadle achieved by the patented air clutch, the accuracy of slide alignment and the minimized period of contact of the hot metal with the dies all contribute to making impression die forging easier and less costly than on slower, less rigid and less accurate presses . . . for impression die forging use an AJAX Forging Press.



Dies and Forging operations for forging tractor steering knuckles in pairs.

•

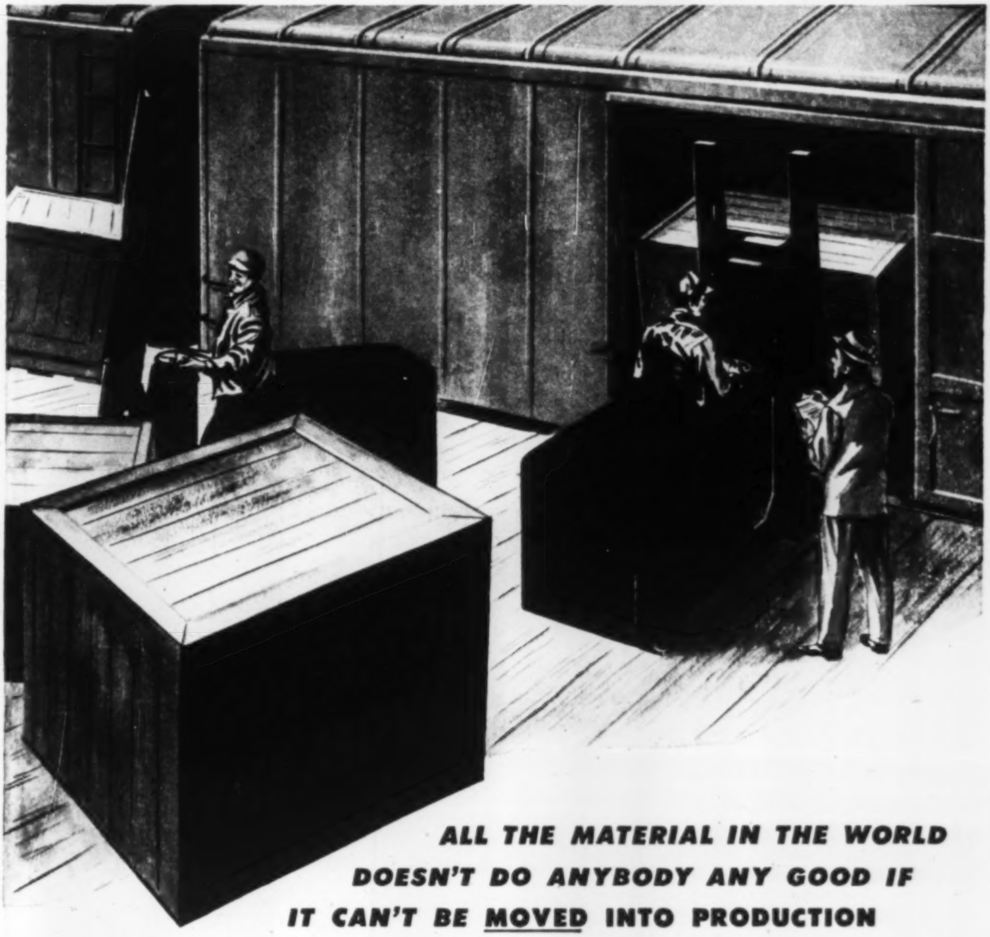
AJAX HIGH SPEED PRESS *forging tractor gear blank at International Harvester Company, Louisville, Kentucky, Works.*

WRITE FOR BULLETIN 75-B

THE Ajax MANUFACTURING COMPANY
EUCLID BRANCH P. O. CLEVELAND 17, OHIO

110 S. DEARBORN ST.
CHICAGO 3, ILLINOIS

DEWART BUILDING
NEW LONDON, CONN.



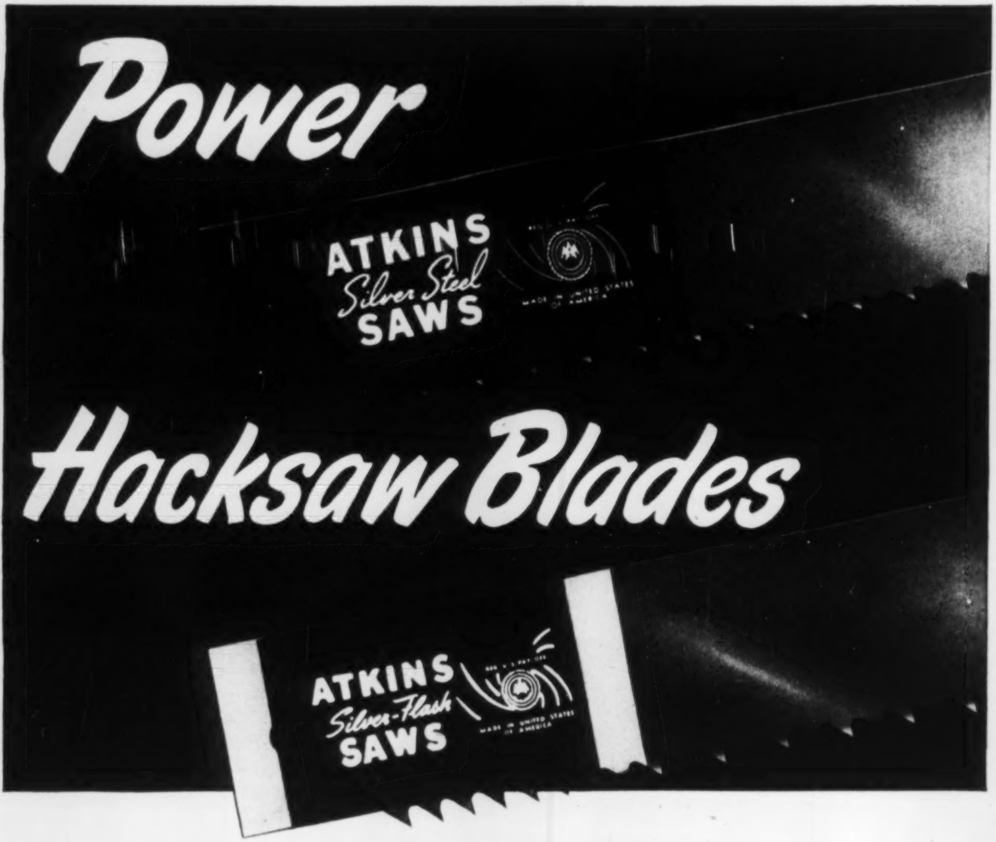
ALL THE MATERIAL IN THE WORLD DOESN'T DO ANYBODY ANY GOOD IF IT CAN'T BE MOVED INTO PRODUCTION

That movement of materials is sped immeasurably by material handling equipment, designed and produced by that alert industry. Thus, hundreds and thousands of tons of products are moved into production *easily, safely, economically*. Much of this tonnage is moved by equipment built, fastened and made stronger with Sterling Bolts and Nuts—because Sterling Bolt products in volume have proved their merit for more than 30 years. This is a matter of record with buyers of bolts and nuts in production quantities.

STERLING BOLT CO.

GENERAL OFFICES: 401 W. ERIE, CHICAGO 10, ILLINOIS
CINCINNATI, INDIANAPOLIS, MILWAUKEE, ST. LOUIS

Power Hacksaw Blades


ATKINS
Silver Steel
SAWS
MADE IN UNITED STATES OF AMERICA
ATKINS
Silver-Flash
SAWS
REG. U. S. PAT. OFF.
MADE IN UNITED STATES OF AMERICA

To Save You Money and Serve You Better!

Silver Steel®

Here is the original high grade hacksaw blade—the blade that has stood the toughest tests of time for more than a quarter of a century! . . . For tough, high carbon steels it is unsurpassed by any blade in the world! It reduces costs by delivering more sawing per blade.

Silver-Flash

Unequaled for sawing lower alloy steels! Tough, yet exceptionally flexible. Here's a blade that will give you fast, clean cutting to very close tolerances—and with the very minimum of breakage and chipping! Invaluable where high production is essential!

Use-
Don't Abuse-
Fine Tools!

ATKINS

E. C. ATKINS AND COMPANY

402 South Illinois Street • Indianapolis 9, Indiana

the drive that has everything

compactness

large load capacity

low original cost

low operating cost

delivery out of stock

modern design

high quality precision gearing

Foote Bros. Line-O-Power Enclosed Gear Drives offer industry compact, straight-line units with efficiencies of 96% or higher.

Duti-Rated high hardness precision gears are assembled into streamlined housings of rugged cast iron.

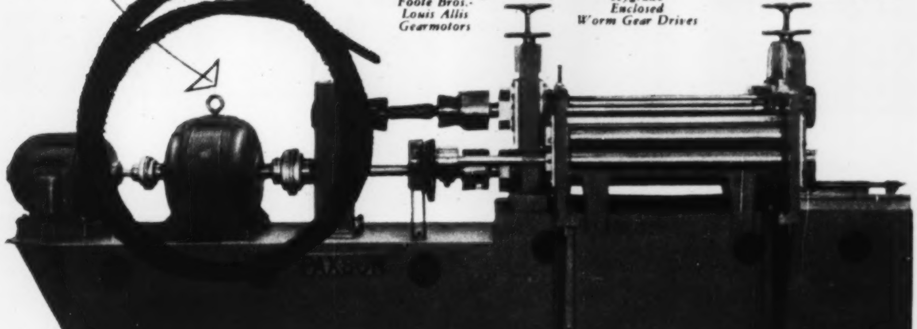
Economical in original cost because the latest, most accurate high production machine tools assure rapid production with exceptional accuracy for long wear life. Economical to operate because simplified construction, minimum number of moving parts, direct splash lubrication, quality workmanship all hold maintenance to a minimum.

Line-O-Power Drives are available for delivery from stock in double or triple reductions for capacities from 1 to 200 h.p., with ratios from 5 to 1 up to 238 to 1

Foote Bros.-Louis Allis Gearmotors

Hygrade Enclosed Worm Gear Drives

Maxi-Power Helical Gear Drives



Standard 36-inch slitter, manufactured by Paxson Machine Co., Salem, Ohio

FOOTE BROS.

Better Power Transmission Through Better Gears

FOOTE BROS. GEAR AND MACHINE CORPORATION
Dept. X, 4545 South Western Blvd.
Chicago 9, Illinois

Foote Bros. Gear and Machine Corporation
Dept. X, 4545 South Western Boulevard
Chicago 9, Illinois

Please send me a copy of Bulletin LPB on Foote Bros. Line-O-Power Drives.

Name

Company

Position

Address

City Zone State

unit heaters & air filters

- Unit Heaters
- Exhaust Fan Guards
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- Floor Furnaces
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Wire Cloth

FOR HEATING, VENTILATING AND AIR CONDITIONING APPLICATIONS

The weather-cock changes direction with every wind. Reynolds wire cloth changes, too. Always in the right direction, but according to plan. Because Reynolds engineers change the wire cloth to meet exact specifications and particular needs of the heating, ventilating and air conditioning industry. Or any manufacturer-user of wire cloth, whether he makes automobiles, farm implements, electrical appliances, kitchen tools. Reynolds engineers believe in progressive change—always working out new ways and new wires that may mean new help to you in bettering your product. Consult them; no obligation.

REYNOLDS WIRE DIVISION
NATIONAL-STANDARD COMPANY

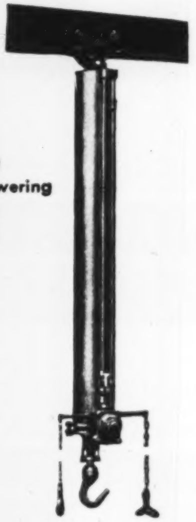
DIXON, ILLINOIS

NS
NATIONAL-STANDARD
Company
NILES, MICHIGAN

IT'S IMPORTANT

To SAVE MAN HOURS
REDUCE PRODUCTION COSTS
INCREASE EFFICIENCY
That's Why It Will Pay You to Investigate

CURTIS AIR COMPRESSORS AIR-OPERATED CYLINDERS & HOISTS

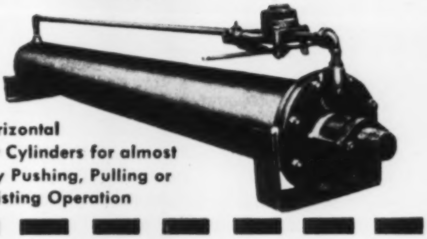


Vertical
Air Hoists
for Low Cost
Lifting or Lowering
of Materials
or Machines

Tank Mounted
Up to 15 H.P.
Inclusive—
Air Cooled

Water-Cooled Compressor,
Up to 50 H.P. Fully Enclosed

- **Dust and Dirt Proof**
- **Carbon Free Valves**
- **Timken Bearings**



Horizontal
Air Cylinders for almost
any Pushing, Pulling or
Hoisting Operation

I-51-1R

Curtis equipment has stood the test of time, because it is precision made from top quality raw materials with 98 years of "know how."

CURTIS PNEUMATIC MACHINERY DIVISION
of Curtis Manufacturing Company
1996 Kienlen Ave., St. Louis 20, Mo.

I am interested in items checked below:

☐ **AIR HOISTS**
Stroke? ☐ Capacity? ☐

☐ **AIR CYLINDERS**
Stroke? ☐ Capacity? ☐

☐ **AIR COMPRESSORS**
Capacity? ☐ Pressure? ☐
Current? ☐

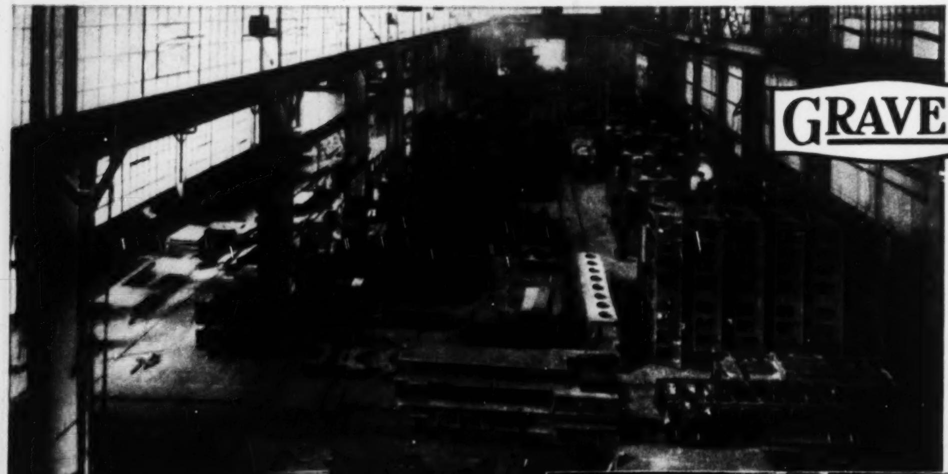
Name..

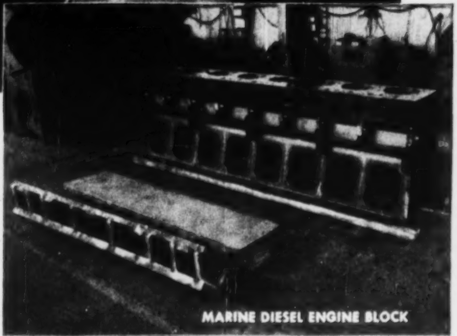
Firm..

Street..

City................Zone......State.........

GRAVER


PART OF GRAVER WELDERY AT EAST CHICAGO PLANT


MARINE DIESEL ENGINE BLOCK

WELDMENTS

in a wide range

by GRAVER

Manufacturers in the heavy industries field have for many years found Graver an excellent source for welded sub-assemblies. From Graver's well-equipped weldery has flowed a continuous succession of weldments for a wide range of industries. Pictured are examples of recent Graver work . . . mass-produced but expertly fabricated . . . with the special advantages secured through sub-contracting to Graver: economy in cost, rigid quality controls, creative engineering and sound welding research.

GRAVER TANK & MFG. CO., INC.

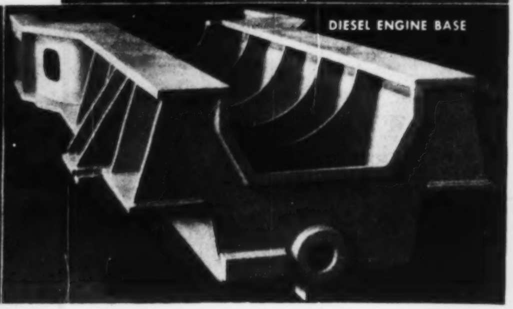
EAST CHICAGO, INDIANA

NEW YORK • CHICAGO • PHILADELPHIA • WASHINGTON
DETROIT • CINCINNATI • CATASAUQUA, PA.
HOUSTON • SAND SPRINGS, OKLA.

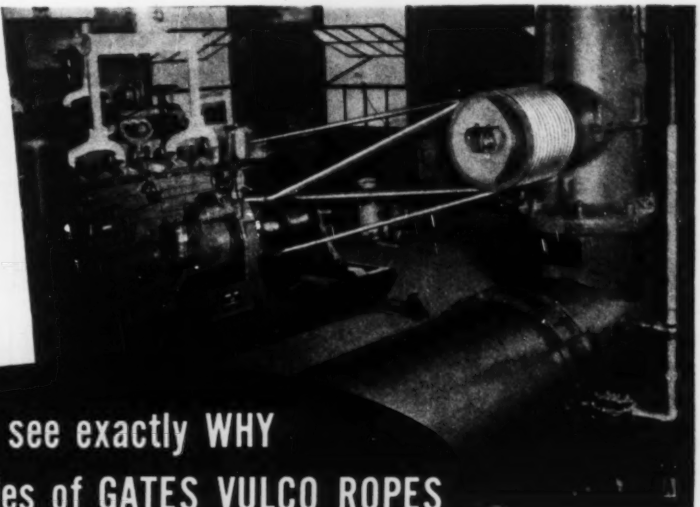
LADLES FOR MOLTEN METAL

LEAD POT

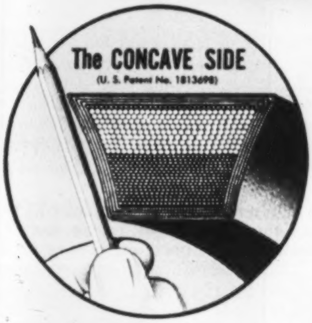
TIN POT


DIESEL ENGINE BASE

To drive one of the new high capacity pumps which removes surface water and runoff from 15,000 acres of Illinois farmland, members of the District Board chose Gates Vulco Ropes, running from two diesel units.



Let's see exactly WHY the Concave Sides of GATES VULCO ROPES mean lower V-Belt Costs!



Every engineer knows how a V-belt *changes shape* when it bends around a pulley.

The top of the belt is under tension—making it grow *narrower.*

The body is under *compression,* causing the sides to bulge out!

Look at figure 1-A in the diagrams, herewith. There you see how a *straight sided* V-belt is forced to bulge in its sheave-groove—and this bulging naturally causes extra wear along the middle of the sides as indicated by the arrows.

Now look at the figure 2-A. There you see how the precisely engineered Concave Sides fill out to an exact fit in the sheave groove.

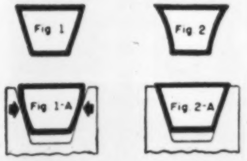
Clearly, the Concave Sides press *evenly* against the V-pulley. This means uniform wear; longer life! The Concave Sides have *full traction;* wear longer because of *full contact!*

To sum up: The Concave Sides of Gates Vulco Ropes (U.S. Patent No. 1813698) give you (1) Less wear, (2) More pulley contact, (3) More sure power transmitted when needed!

Only V-belts made by Gates are built with concave sides. Whenever you buy V-Belts, be sure you get the V-Belt with the Concave Sides—The Gates Vulco Rope!

What Happens When a V-Belt Bends

Straight-Sided V-Belt | **Gates Vulco Rope with Concave Sides**



How Straight-Sided V-Belt Bulges in Sheave-Groove. Sides Press Unevenly Against V-Pulley Causing Extra Wear At Point Shown by Arrows.

The Concave Sides Fill out to a Precise Fit in the Sheave Groove. No Side Bulge! Sides Press Evenly Against the V-Pulley—Uniform Wear—Longer Life!

CS-521

Gates

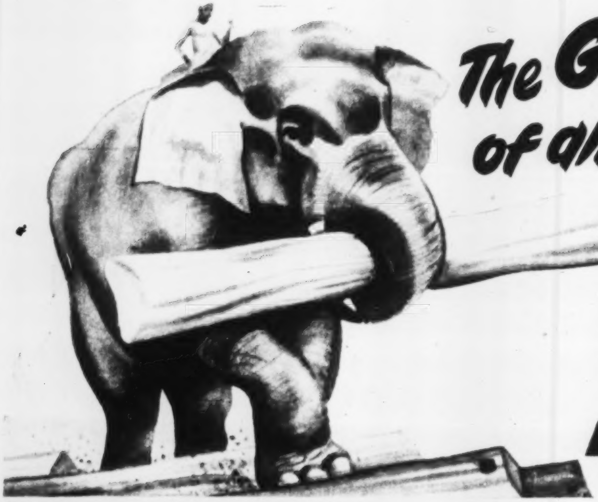
Hose V-Belts
Molded Rubber Goods
for Industry

World's Largest Maker of V-Belts

VULCO ROPE DRIVES

ENGINEERING OFFICES AND JOBBER STOCKS
IN ALL INDUSTRIAL CENTERS

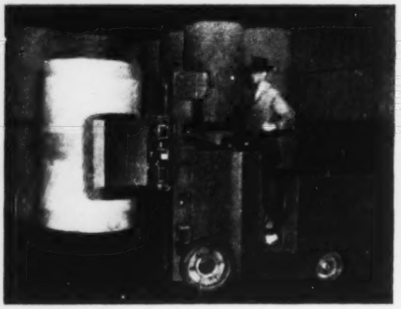
THE GATES RUBBER COMPANY • DENVER • U•S•A



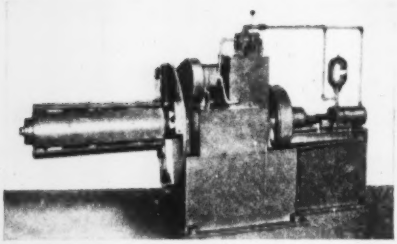
The GRIP of an ELEPHANT

with a

10 CUBIC INCH GREER ACCUMULATOR



This lift truck holds heavy paper rolls between its jaws with the grip of an elephant, thanks to a 10 cubic inch Greer Accumulator. There is no chance of the roll slipping because the accumulator automatically compensates for any hydraulic fluid leakage or pressure loss.



Steel coils on this pay-off roll are held firmly in place during uncoiling by hydraulic pressure stored in a one gallon Greer Accumulator. A pressure switch eliminates the necessity for continuous pumping during the extended holding operation, saving power and pump wear.

Greer Hydro-pneumatic Accumulators are revolutionizing the design of materials handling and production equipment. Cumbersome, complicated, expensive devices for holding and chucking are being replaced with simple, efficient hydraulic units and Greer Accumulators.

A Greer Accumulator consists of a gas filled synthetic bag inside a steel chamber which stores hydraulic fluid pumped into it against pressure in the bag. This energy can be released as needed for restoring pressure loss due to fluid leakage in the system, as an auxiliary source of power for peak loads, and for many other functions described in our new Bulletin 301.

GREER
ACCUMULATORS

Greer Bulletin 301 is packed with ideas showing how to reduce the size, complexity, and operating cost of equipment with Greer Accumulators by utilizing energy ordinarily wasted during prolonged holding cycles or during intermittent machine operations. Send for your copy today.

GREER ACCUMULATORS

U. S. PATENTS UNDER OLEAR LICENSES

GREER HYDRAULICS, INC.

450 EIGHTEENTH STREET • BROOKLYN 15, NEW YORK

Sales Representatives in Principal Cities • District Office: 407 So. Dearborn St., Chicago 5

Manufacturers of Hydraulic Accumulators • High Pressure Hydraulic Components

A NEW STEP FORWARD...
IN AUTOMATIC NUT FORMING..
in less than ½ a second
Scrap

To step-up your nut-producing facilities, look to Waterbury-Farrel's new line of automatic nut formers.

Check these production-boosting design features.

HIGH SPEED—without sacrificing quality. Nut blanks need no subsequent operation except threading.

SIMPLIFIED TOOLING—larger tool holders.

EASY-TO-GET-AT ADJUSTMENTS—save "down" time.

We're always pioneering . . . we started over 100 years ago on March 5, 1851. When we stop pioneering, we stop (period). In this ad you'll find evidence that we're going ahead, into our second century.

In Equipment, Experience Counts . . . We were 100 in '51!

NEW CUT-OFF DEVICE—of ingenious design.

SIMPLIFIED TRANSFER MECHANISM — with locking device for position.

HYDRAULIC CONTROL — for feed and brake action.

SAFETY-INTERLOCKED LUBRICANT PUMPS—for machine and tools. Machine cannot be operated until lubricant is turned on.

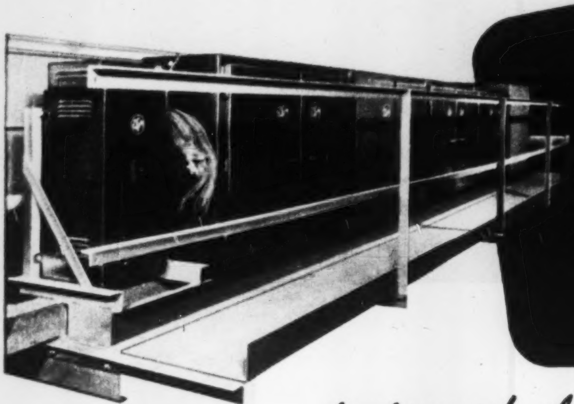
BLANK INVERTER—for work that must be turned over during sequence of operations.

Write, wire or phone for further information.

WATERBURY FARREL
FOUNDRY & MACHINE COMPANY
WATERBURY, CONNECTICUT, U. S. A.
Sales Offices: Chicago, Cleveland and Newark

COLD PROCESS BOLT AND NUT MACHINERY: Headers (all types) • Re-headers • Trimmers • Thread Rolling Machines • Slotters • Nut Tappers, etc. *POWER PRESSES:* Crank, Cam and Toggle; also Rack and Pinion Presses • Multiple Plunger Presses • Hydraulic Presses, etc. *MILL MACHINERY:* Rolling Mills • Wire Flattening Mills, Chain Draw Benches • Slitters and various accessory mill machinery. *WIRE MILL EQUIPMENT:* Continuous Fine Wire Drawing Machines (Upright Cone and Tandem) • Bull Blocks • String-up Machines • Spoolers, etc.

WF-2



For
NORTHERN
CRANES

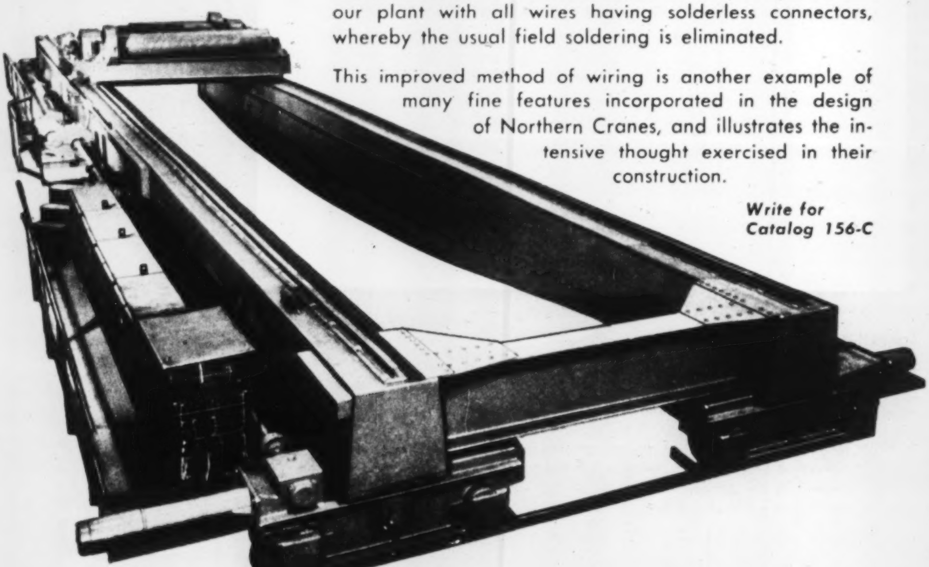
improved electrical layout

"Mounted on a Common Support"

For expedient field installation and wiring, all magnetic panels are mounted on a common support with all wires, where possible, contained in metal raceways having removable covers. Northern Cranes are completely wired in our plant with all wires having solderless connectors, whereby the usual field soldering is eliminated.

This improved method of wiring is another example of many fine features incorporated in the design of Northern Cranes, and illustrates the intensive thought exercised in their construction.

Write for Catalog 156-C

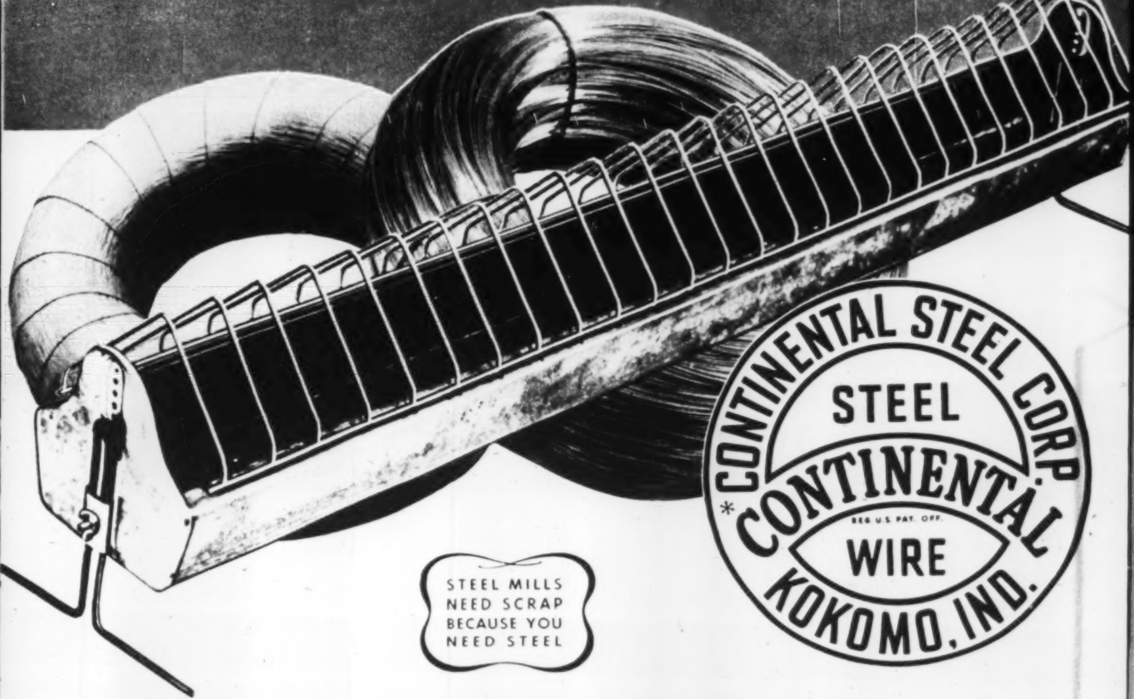


NORTHERN ENGINEERING WORKS

General Offices: 2615 Atwater St., Detroit 7, Michigan

BUILDERS OF CRANES AND HOISTS EXCLUSIVELY

We Sell the Wire . . . We GIVE the Service



CONTINENTAL STEEL CORP.
STEEL
*CONTINENTAL
REG. U.S. PAT. OFF.
WIRE
KOKOMO, IND.

STEEL MILLS
NEED SCRAP
BECAUSE YOU
NEED STEEL

Making wire that will work for our customers . . . that's our job at Continental. These wire users know when they place their wire requirements with us that they can depend on Continental's interest and ability to supply them with exactly what they need in temper, finish, or special shapes. They know they can expect the type of close, personal service that often results in the saving of both time and money. That's why year after year they select Continental as their chief source of supply for wire.

Shaped Wire . . . For Parts or Trim

Many Continental wire customers save money, add sales appeal to their products by using the right shaped wire for basic parts or exterior trim. Providing wire in special shapes is another Continental service for its customers.

Trade Marks Reg. U.S. Pat. Off.

CONTINENTAL
STEEL

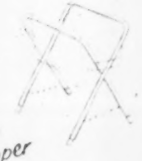
CONTINENTAL
STEEL CORPORATION

GENERAL OFFICES • KOKOMO, INDIANA

PRODUCERS OF *Manufacturer's Wire* in many sizes, shapes, tempers and finishes, including Galvanized, KOKOTE, Flame-Sealed, Coppered, Tinned, Annealed, Liquor Finished, Bright, Lead Coated, and special wire. ALSO, Coated and Uncoated Steel Sheets, Nails, Continental Chain Link Fence, and other products.

Bundyweld "Doodles"

to jog a designer's imagination



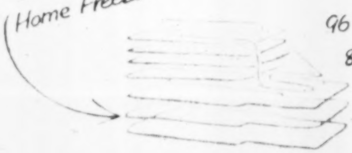
Frame of popular laundry hamper

Redesigning an old product? Developing a new one? With Bundyweld Tubing on the job, there's every chance for improved performance, lowered cost, smoother production, or some other practical plus.

No other tubing has all the Bundyweld features. It's the only tubing double-walled from a single strip, with inside and outside beveled edges.

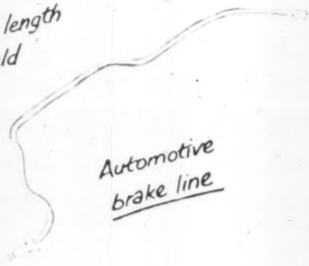
Too, you may profit from Bundy's famous fabrication skills. In working out tubing parts like those shown here, we may have found the answer to something baffling you. Or we can develop a new solution. Let us send you information on Bundyweld Tubing or Bundy services. ***Bundy Tubing Company, Detroit 14, Michigan.***

Barrel of Water pistol



Coil for a Home Freezer

96 bends – 82' continuous length of Bundyweld



Automotive brake line

Bundyweld® Tubing

DOUBLE-WALLED FROM A SINGLE STRIP

- **Extra-strong**
- **High fatigue limit**
- **Leakproof**
- **High bursting point**
- **High thermal conductivity**
- **Shock-resistant**
- **Ductile**
- **Easily machined**
- **Takes plating**
- **Takes plastic coating**
- **Scale-free**
- **Clean inside and out**
- **No inside bead**
- **Uniform I.D., O.D.**

WHY BUNDYWELD IS BETTER TUBING

Bundyweld starts as a single strip of copper coated steel. Then it's . . .

continuously rolled twice around laterally into a tube of uniform thickness, and

passed through a furnace. Copper coating fuses with steel. Presto . . .

SIZES UP TO 5/8 O.D.

Bundyweld, double-walled and brazed through 360° of wall contact.

SIZES UP TO 5/8" O.D.

← **NOTE** the exclusive patented Bundyweld beveled edges, which afford a smoother joint, absence of bead and less chance for any leakage.

Bundy Tubing Distributors and Representatives: ***Cambridge 42, Mass.:*** Austin-Hastings Co., Inc., 226 Binney St. • ***Chattanooga 2, Tenn.:*** Peirson-Deakins Co., 823-824 Chattanooga Bank Bldg. • ***Chicago 32, Ill.:*** Lapham-Hickey Co., 3333 W. 47th Place • ***Elizabeth, New Jersey:*** A. B. Murray Co., Inc., Post Office Box 476 • ***Philadelphia 3, Penn.:*** Rutan & Co., 1717 Sansom St. • ***San Francisco 10, Calif.:*** Pacific Metals Co., Ltd., 3100 19th St. • ***Seattle 4, Wash.:*** Eagle Metals Co., 4755 First Ave. South ***Toronto 5, Ontario, Canada:*** Alloy Metal Sales, Ltd., 881 Bay St. • **Bundyweld nickel and Monel tubing is sold by distributors of nickel and nickel alloys in principal cities.**

Progress IN NUT TAPPING!

NEW SIZES . . . NEW HIGH SPEEDS . . . NEW VERSATILITY

NATIONAL
PRECISION
TAPPER

NEW SIZES & SPEEDS—You can now tap a complete range of hex and square nuts, from 10-32 up through 1 1/2" National Coarse, at 75 cutting feet per minute!

NEW VERSATILITY—Convert from right to left hand threads (and vice-versa) in only 90 minutes. Longer tap life and better threads result from National's non-reversing, free-floating, 180-degree hook tap. Clean, chip-free nuts are ideal for power wrenching.

NEW DESIGN—New mechanical features, including electrical safety shutoffs, make this entirely automatic tapper trouble-free.

TAP & TOOL CHANGES—Always quick and easy, spell high output and round-the-clock dependability.

TESTIMONIALS—"Our new 1/4" National went into the line today and tapped 42,300 1/4 x 20 nuts in eight hours."

"Only four men operate our 60 Precision Tappers, all Nationals."

"Our new 3/4" National tapped 12,300 3/4 x 20 nuts in eight hours."

"We average 85,000 to 100,000 cold-formed nuts per tap."

"For tapping touchy stainless locknuts for jet aircraft engines, we use Nationals exclusively."

"Our six Precision Tappers—four 1/4" and two 3/8"—have operated 40 hours per week for 12 months, averaging 6,000 gross of cold-formed nuts per week. Tap consumption averaged less than half a tap per machine per week."

"We beat all previous records by tapping 952,000 nuts in one 24-hour day recently on our Nationals."

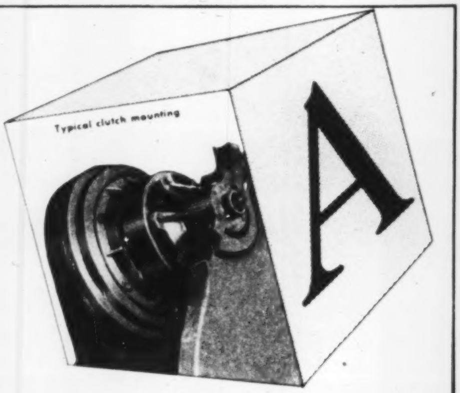
NATIONAL
MACHINERY COMPANY
TIFFIN, OHIO — SINCE 1874

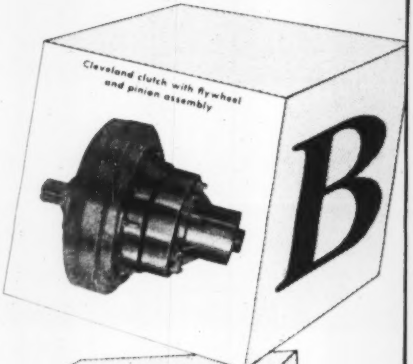
DESIGNERS AND BUILDERS OF MODERN FORGING MACHINES • MAXIPRESSES • REDUCEROLLS • COLD HEADERS • BOLTMAKERS • NUT FORMERS • TAPPERS • NAILMAKERS

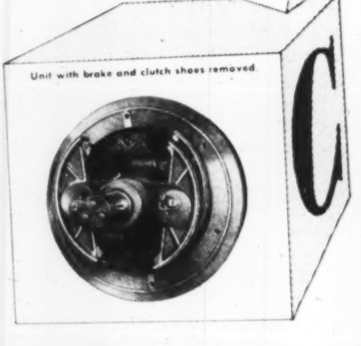
Hartford Detroit Chicago

Simple as

A B C


Typical clutch mounting


Cleveland clutch with flywheel and pinion assembly


Unit with brake and clutch shoes removed.

Design simplicity of the Cleveland Drum Type Friction Clutch and Brake assures *foolproof operation, minimum maintenance* and *easy adjustment.* You are assured of exact control of the slide during all phases of operation. Clutch and Brake cannot engage simultaneously . . . always full clutch *or* full brake. Patented drum type design gives quicker starts and stops. If electric or air supply fails, positive spring loaded brake stops slide immediately.

Foolproof design and lightweight construction reduces horsepower required for clutch operation. Long friction life is assured as all idle friction surfaces are completely disengaged eliminating drag, unnecessary wear and destructive heat. Clutch and brake adjustments are easily made without removing unit from press. Minimum number of moving parts makes clutch operation and maintenance simple as ABC.

Be sure to investigate the opportunities for increased production at lower unit costs offered by Cleveland Drum Type Friction Clutches. They can be installed on most Cleveland Presses new or old. Complete information will be forwarded upon request.

THE CLEVELAND
PUNCH & SHEAR WORKS CO.
U.S.A.
Established 1880

PUNCHING TOOLS & DIES
OFFICES AT
NEW YORK....CHICAGO
DETROIT....PHILADELPHIA
E. LANSING

FABRICATING TOOLS
CLEVELAND 14, OHIO

• • • • • • POWER PRESSES • • • • • •

fine Jessop steel is most carefully watched

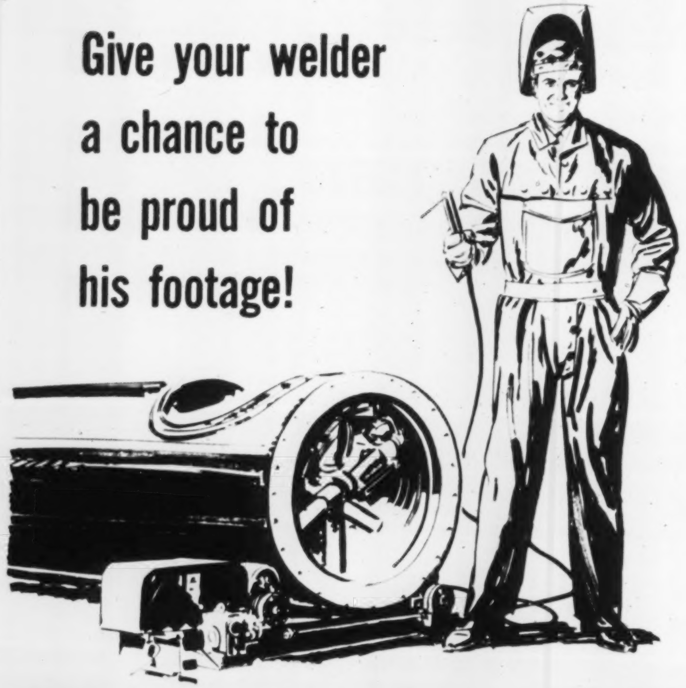
There is more than skillful melting and working and treating behind Jessop's reputation for the finest specialty steels. Each batch is subjected to rigid quality control at all stages, to assure precise formula and condition. When you buy from Jessop, you buy more than good steel. You acquire metal that is custom-made to your specific need.

HIGH SPEED STEELS · HIGH SPEED BITS · PRECISION GROUND FLAT STOCK · HIGH SPEED AND ALLOY SAW STEELS · HOT WORK DIE STEELS · COLD WORK DIE STEELS · CARBON AND ALLOY STEELS · STAINLESS AND HEAT RESISTING STEELS · VALVE STEELS · STAINLESS-CLAD STEELS · CAST-TO-SHAPE STEELS · COMPOSITE TOOL STEELS · ARMOR PLATE

JESSOP

STEEL COMPANY · WASHINGTON, PENNSYLVANIA

Give your welder a chance to be proud of his footage!



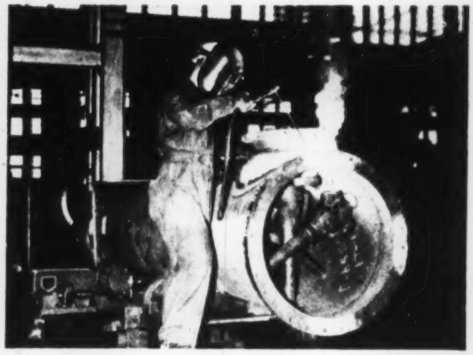
It's *waste welding time* when welders have to climb over, prop up or flop the work piece to get at the different seams.

It's *all arc-time* when Worthington-Ransome Turning Rolls and Welding Positioners are used. All welds can be tilted or turned into position—without delay—for continuous downhand welding.

Result—up to 50% more footage, *better* welds (using higher current and heavier rods), less welding rod waste.

Write Worthington Pump and Machinery Corporation, Dunellen, New Jersey, for bulletins or additional information.

With one set-up, work piece may be tilted and rotated for either automatic or manual welding. Welding Positioner capacities from 100 lb to 30 tons.



Production goes up on manual or automatic welding, whether repetitive or job work. Turning Rolls from 3 to 150 tons, stationary or self-propelled.

WORTHINGTON

50%

PRODUCTION UP

Welding Positioners
Turning Rolls

LABOR COSTS DOWN

YI-1

Ubiquitous!

Seymour Phosphor Bronze

...it's here in your fire alarm signals!

Seymour Phosphor Bronze is a part of the electrical systems of an important number of the country's fire alarms.

...it's here in this lonesome lighthouse!

Because of its flexibility and corrosion resistance, Seymour Phosphor Bronze is used in fog horn diaphragms.

...it's here in this television receiver!

Seymour Phosphor Bronze is used at numerous points in the critical electrical mechanism of television receivers.

...it's here in paper mill machinery!

In paper mills, Fourdrinier screens of Seymour Phosphor Bronze receive the pulp.

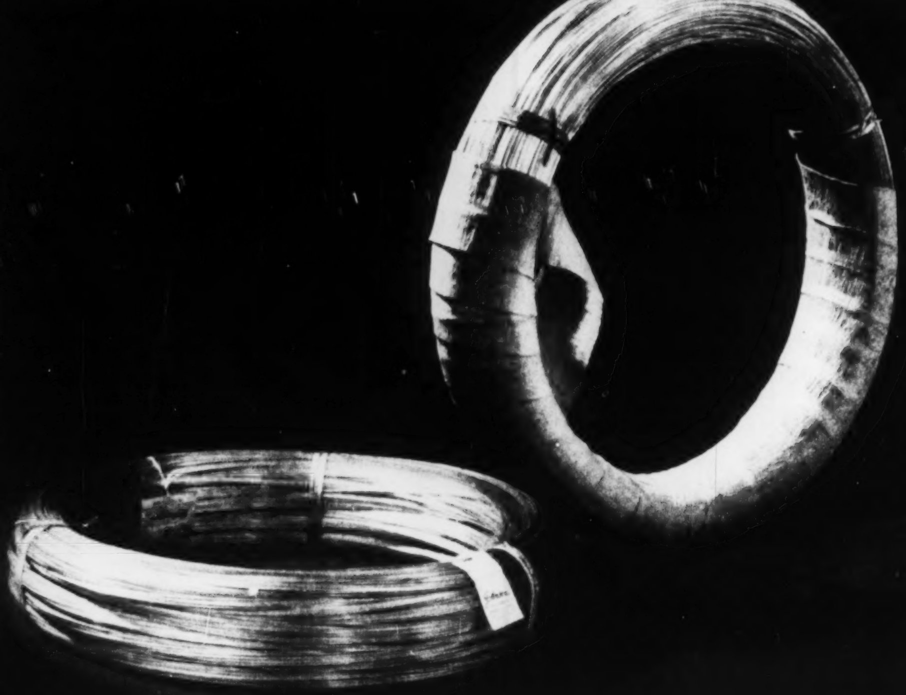
...it's here in this life saving iron lung!

In iron lungs, because operation must not stop, pump bellows are made of Seymour Phosphor Bronze.

...and it's here in this diesel locomotive!

Switch contact points in electrical systems of modern locomotives are made of Seymour Phosphor Bronze.

Everywhere!



"Johnson Sets the Standard for the Industry."

For your processes it will pay you well to specify wires made in this specialty mill. You will save time, maintain quality. JOHNSON makes wire as fine as .003".

- MUSIC SPRING WIRE.
- VACUUM HOSE WIRE.
- AIRCRAFT CABLE WIRE.
- HIGH CARBON ROPE WIRE.
- HARD DRAWN SPRING WIRE.
- OIL TEMPERED SPRING WIRE.
- HIGH TENSILE GALVANIZED STEEL WIRE.
- HOSE REINFORCEMENT WIRE (BRAIDED TYPE).
- FLAT AND HALF OVAL SPECIAL SPRING WIRE.
- BRUSH WIRE FOR HAND AND POWER BRUSHES.

If it's steel wire—Johnson makes it better

JOHNSON

STEEL AND WIRE COMPANY, INC.
WORCESTER 1, MASS.

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G-E Adjustable-speed Drive Increases Ozalid Machines' Versatility, Accuracy

Reproduction machine's speed easily set for various kinds of paper, with electronic Thy-mo-trol* drive

Reproducing "short-order" copies of virtually any kind of printed matter, drawings, etc. is the function of Ozalid's new Ozamatic machine. One secret of the versatility of this and all other Ozalid machines is G-E Thy-mo-trol drive.

Speed of the machine must be matched to the type, weight, and thickness of paper being used in each copying job. The simplicity of the Thy-mo-trol drive permits the operator to make the proper speed adjustment quickly and accurately simply by turning the speed-control knob. Thus, the machine can handle a great variety of copy jobs quickly, and with little training required for the operator.

The electronic precision of Thy-mo-trol, one of G.E.'s adjustable-speed family, has helped many equipment manufacturers improve the performance of their machines by greatly increasing their versatility and accuracy. And G-E adjustable-speed drives are helping manufacturers in every field to increase production with improved quality control, saving scarce materials, cutting rejects, and making existing machinery more flexible. One or more of this versatile drive family can probably do the same for you. Best way to find out is to mail the coupon below.

ON THE OZAMATIC, Ozalid's new desk-top machine, the operator quickly and accurately selects the desired speed — from 0 to 30 feet per minute — simply by turning the speed-control knob. Electronic Thy-mo-trol drive — standard equipment on all Ozalid machines who pioneered its use on reproduction machines — does the rest.

WHICH DRIVES ARE BEST FOR YOU?

adjustable
SPEED

This 26-page manual will help you decide. It shows you how to go about selecting the *right* drive. The handy drive chart included is worth your detailed study. Bulletin GEA-5334. Check here ☐

General Electric Company, Section C646-17
Schenectady 5, N. Y.

Please send me the bulletins checked:
☐ for reference only
☐ for planning an immediate project

NAME
COMPANY
ADDRESS
CITY ______ STATE ______

THE ACA MOTOR—*Speed ranges to 20:1*—An adjustable-speed a-c motor. Speed range 3:1 or 4:1 continuous; for intermittent operation from 6:1 to 20:1. Bulletin GEA-4883. Check here ☐

THE SPEED VARIATOR—*Speed ranges to 40:1*—An adjustable-voltage d-c drive that uses a-c power. Speed ranges 8:1 to 40:1 and beyond. Bulletin GEA-5335. Check here. ☐

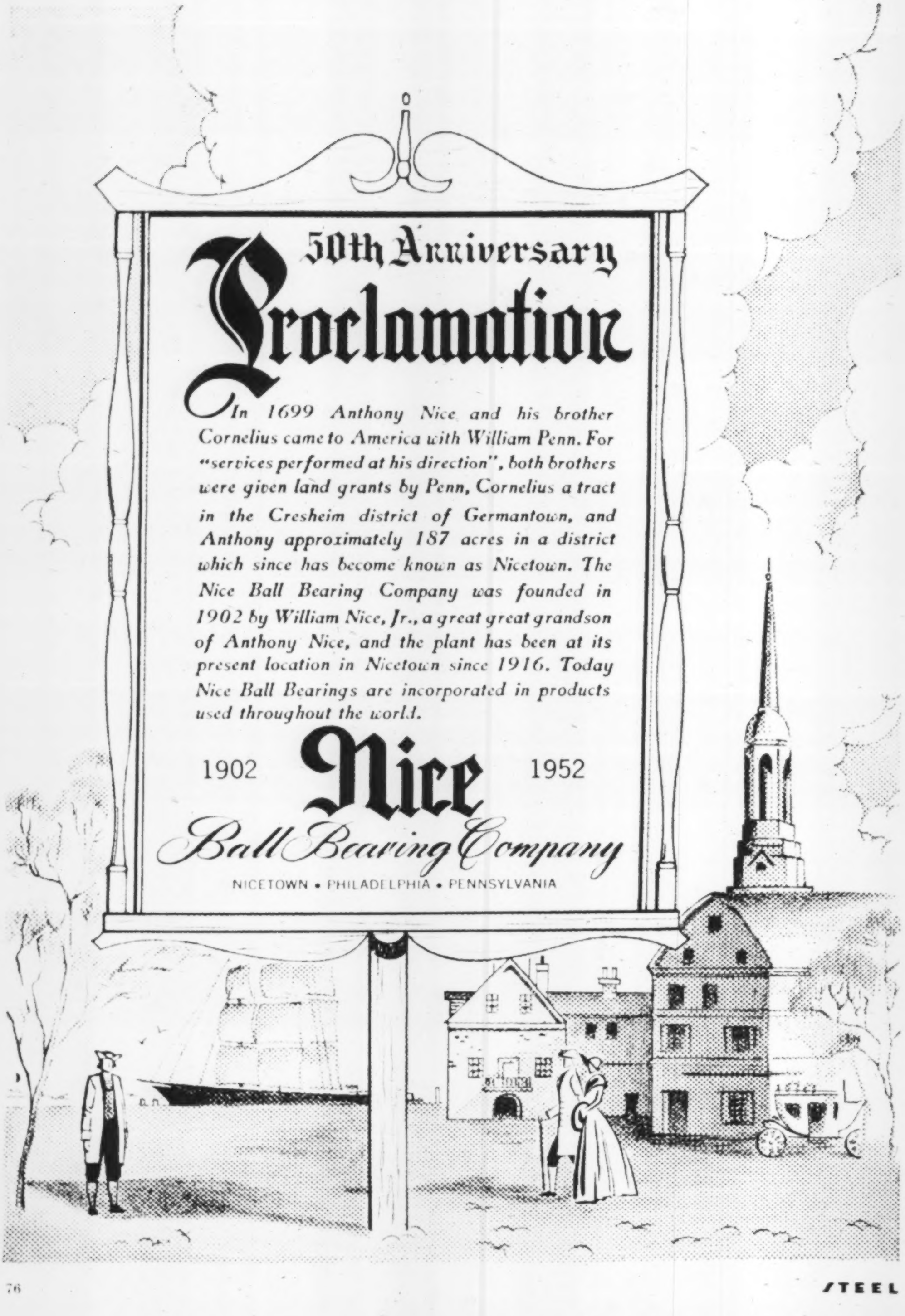
THY-MO-TROL*—*Speed ranges to 100:1*—The most accurate, most versatile, and fastest acting of all G-E adjustable-speed drives. Speed ranges of 100:1 or better. Bulletin GEA-5337. Check here. ☐

ELECTRONIC SPEED VARIATOR—An electronically controlled version of the Speed Variator that offers most of the features of Thy-mo-trol for applications in the 15 to 60-hp range at moderate cost. Bulletin GEA-5336. Check here ☐

* *Thy-mo-trol is the General Electric Company's registered trademark for its electronic motor control system.*

Headquarters for ELECTRICAL ADJUSTABLE-SPEED DRIVES

GENERAL ELECTRIC



50th Anniversary Proclamation

In 1699 Anthony Nice and his brother Cornelius came to America with William Penn. For "services performed at his direction", both brothers were given land grants by Penn, Cornelius a tract in the Cresheim district of Germantown, and Anthony approximately 187 acres in a district which since has become known as Nicetown. The Nice Ball Bearing Company was founded in 1902 by William Nice, Jr., a great great grandson of Anthony Nice, and the plant has been at its present location in Nicetown since 1916. Today Nice Ball Bearings are incorporated in products used throughout the world.

1902 **Nice** 1952

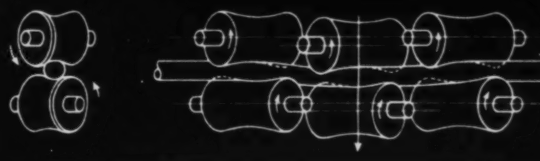
Ball Bearing Company

NICETOWN • PHILADELPHIA • PENNSYLVANIA

MACK-HEMP

guideless rotary straighteners
FOR
# production-line straightening and finishing
OF
# metal tubing and pipe

1/16" O. D.
TO
15" O. D.



The Mackintosh-Hemphill method of straightening is accomplished by an offset cross-roll pass between two fixed cross-roll passes (patented). No guides are required because the rolls are driven on both sides of the stock which is supported by the bottom rolls. With this balanced arrangement there is no decreasing efficiency from uneven wearing of the rolls. The straightening takes place from section to section and not from point to point.

These modern productioneering tools straighten and finish cut-length material such as stainless instrument tubing, aluminum aerial stock, copper fuel lines, aviation brake tubing, standard welded pipe, heavy-wall seamless alloy tubes, large diameter wrought-iron pipe, and many other ferrous and non-ferrous tubular products *in sizes ranging from 1/16" O.D. to 15" O.D.*

Mack-Hemp Rotary Straighteners employ a six-roll arrangement, basic in all sizes, which

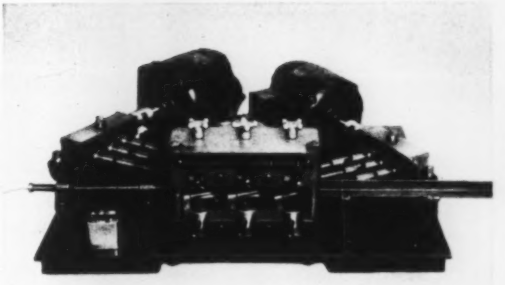
- **STRAIGHTENS** to precision tolerances, end-to-end
- **FINISHES** without leaving spiral scores, cuts, or rub marks on exterior surfaces
- **REMOVES** end bends from cut-length stock
- **SPEEDS** straightening and surface finishing operations

Mackintosh-Hemphill Rotary Straighteners employ a patented roll arrangement with an offset cross-roll pass between two fixed cross-roll passes.

This feature eliminates supporting guides for the material and increases the productive life of the rolls.

Send for bulletin S-7265 which describes in detail, the Mack-Hemp Rotary Straightener.

MODEL AYZ MACK-HEMP ROTARY STRAIGHTENER.
NOTE CIGARETTE LIGHTER AT LOWER LEFT.

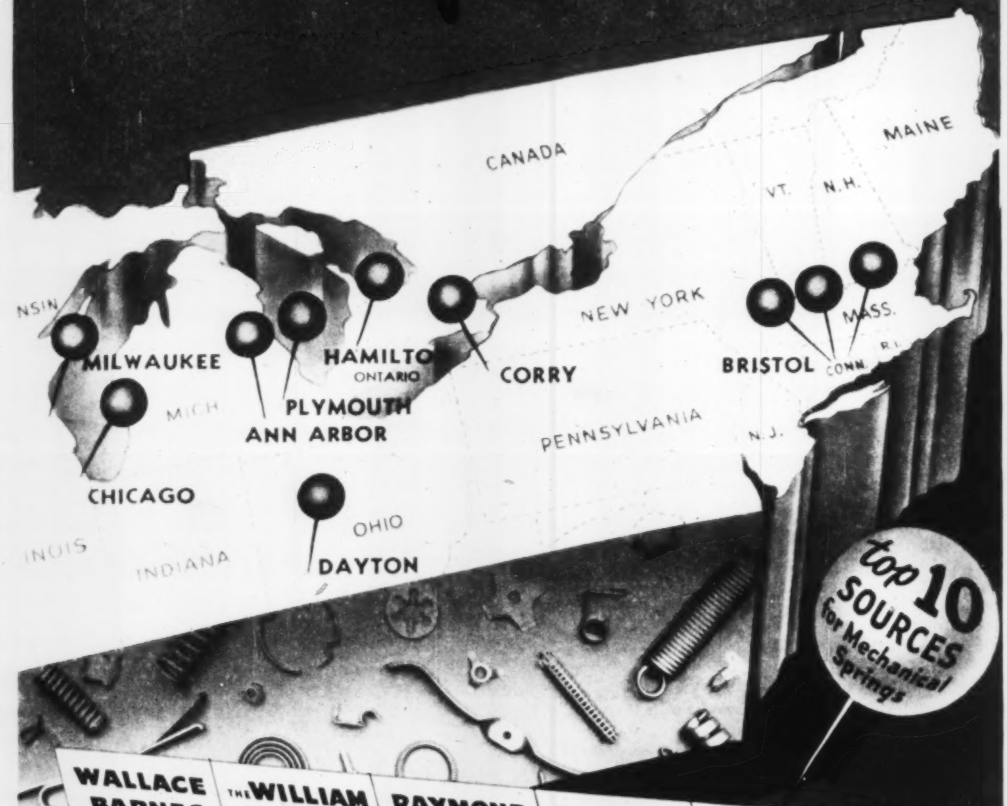


MACKINTOSH-HEMPHILL
COMPANY
PITTSBURGH and MIDLAND, PENNSYLVANIA

MACKINTOSH-HEMPHILL PRODUCTS INCLUDE: ROLLS . . . STEEL AND SPECIAL ALLOY CASTINGS . . . COMPLETELY INTEGRATED STRIP MILLS . . . HEAVY DUTY ENGINE LATHES . . . MACKINTOSH-HEMPHILL ROTARY STRAIGHTENERS . . . IMPROVED JOHNSTON PATENTED CORRUGATED CINDER POTS AND SLAG-HANDLING EQUIPMENT . . . SHAPE STRAIGHTENERS . . . END-THRUST BEARINGS . . . SHEARS . . . LEVELLERS

Pin Point Service –

in the great Spring Using Area of America . . .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DIVISIONS OF
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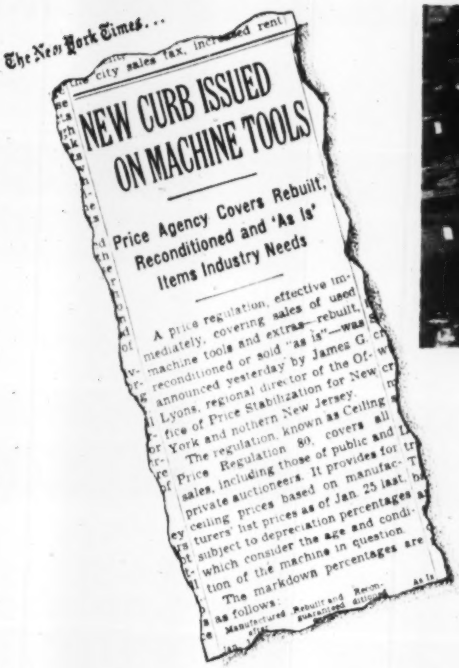
What it means for a machine tool to be "rebuilt and guaranteed"



The New York Times...

city sales tax, increased rent

NEW CURB ISSUED ON MACHINE TOOLS

Price Agency Covers Rebuilt, Reconditioned and 'As Is' Items Industry Needs

A price regulation, effective immediately, covering sales of used machine tools and extras—rebuilt, reconditioned or sold "as is"—was announced yesterday by James G. Lyons, regional director of the Office of Price Stabilization for New York and nothern New Jersey.

The regulation, known as Ceiling Price Regulation 80, covers all sales, including those of public and private auctioneers. It provides for ceiling prices based on manufacturers' list prices as of Jan. 25 last, subject to depreciation percentages which consider the age and condition of the machine in question.

The markdown percentages are as follows:

Manufactured after Jan. 1 | Rebuilt and guaranteed | Recon-ditioned | As Is

The Office of Price Stabilization, through Ceiling Price Regulation 80, recognizes the basic difference between a "rebuilt" machine tool and a "reconditioned" one: *Rebuilding restores a machine to its original operating efficiency.*

At Simmons we call this *Engineered Rebuilding,* and here's what we mean by the term:

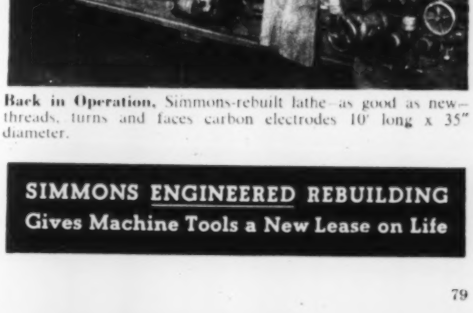
The machine is completely dismantled to the main castings and thoroughly cleaned. All worn shafts, bearings and other parts are replaced or renewed, and all sliding surfaces are ground or scraped. When reassembled, the machine is tested under power to meet tolerances specified by the original manufacturer . . . truly a new lease on life.

When you buy a rebuilt machine tool from Simmons or send us one for rebuilding, you do so with confidence. All work is guaranteed. This practice has made many friends and repeat customers for us. It has also made it possible for us to become the world's largest rebuilder of machine tools.

SIMMONS MACHINE TOOL CORPORATION
1755 North Broadway, Albany 1, N. Y.

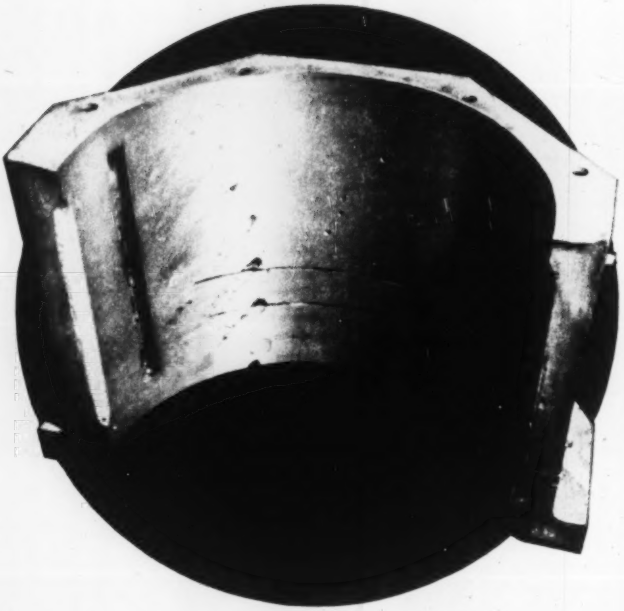
Engineered Rebuilding begins with dismantling to main castings. All worn parts are then refinished or replaced. When re-assembled, the machine must meet tolerances of a new one.

Surface Grinding is one of the major rebuilding operations. Specially-designed planer-type grinder accommodates castings 74" wide, 72" high and up to 40' long; grinds angles; planes and mills.



Back in Operation. Simmons-rebuilt lathe—as good as new—threads, turns and faces carbon electrodes 10' long x 35" diameter.

SIMMONS ENGINEERED REBUILDING
Gives Machine Tools a New Lease on Life



Price: $.00029 Per Rolled Ton!

How National Bearing Division helps its customers lick costly maintenance problems

If there's one thing tougher than rolling mill service, it's the bronze bearing above. This bearing was completely designed—from the inside out—by National Bearing Division and installed on a trial basis by one of the country's largest steel producers

Result? Where the service life of bearings previously used averaged just 13 weeks, this bearing ran exactly 16 months and 4 days . . . rolling 1,315,000 tons! Maintenance expenses—including costs of replacement and down-time—were cut right to the bone.

This record-breaking performance was made possible through a special design by National Bearing Division . . . a design involving alloy, bore, grease grooves, babbitt pockets and machining procedure. And, performance of these bearings is so consistently outstanding that the same mill now standardizes on their use.

We're proud of examples like this—because they show how effectively our facilities for Alloy Research and Engineering—combined with 75 years of practical application experience—make money-saving solutions to problems on . . .

Non-Ferrous Bearings and Castings—
As Cast or Machined

Bronze Bars—
As-Cast or Machined;
Cored, Solid, Hexagon

Babbitt Metals—
For every type of
bearing service

AMERICAN
Brake Shoe
COMPANY

NATIONAL BEARING DIVISION
4925 Manchester Avenue • St. Louis 10, Mo.

PLANTS IN: ST. LOUIS, MO. • MEADVILLE, PA. • NILES, OHIO • PORTSMOUTH, VA. • ST. PAUL, MINN. • CHICAGO, ILL.

RUGGED TOUGHNESS...

Velvet Smoothness

FOR HIGHER SPEEDS FASTER PRODUCTION

Sturdy, longer life built into every length of Atlas Roller Chain assures rugged toughness on every installation. The Atlas Nicarb Process used for case hardening bushings and pins is one big reason for the stamina of Atlas "Super-Life" Chain. Nicarbing provides an outer surface strongly bound to the core of steel which provides greater strength and wear resistance.

Atlas Chain drives operate with a velvety smoothness made possible by precision made bearings rolling at every point of contact. These bearings—pins, bushings and rollers—are of specially selected steels finished by Atlas's Exclusive "Mirro-finish" process.

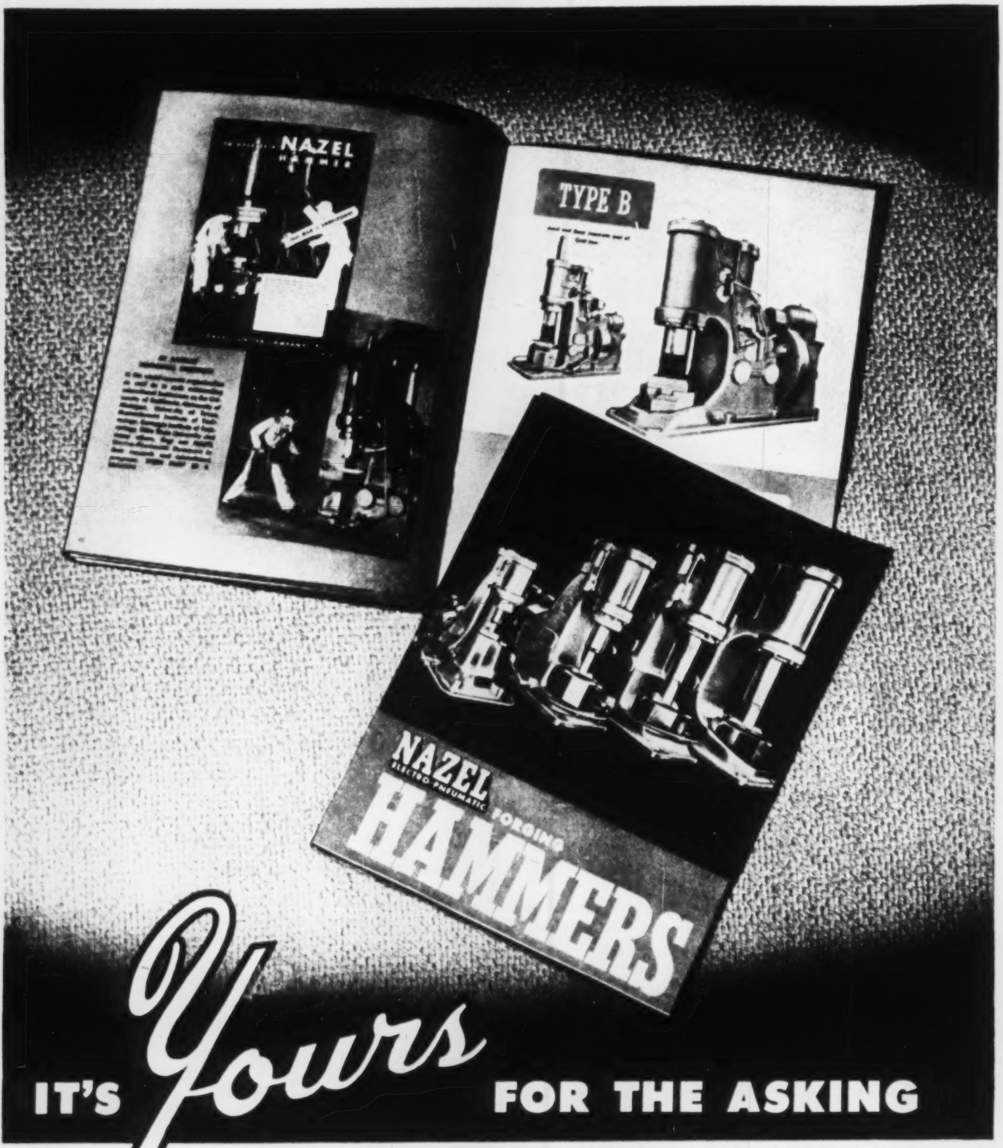
The result is a super-life chain that minimizes wear and repair. Greater efficiency . . . greater economy on every drive. To speed up production and cut maintenance install Atlas positive-power drives. Write for new handbook and catalog on chain drives . . . no charge, no obligation.

ATLAS CHAIN & MANUFACTURING CO.
Philadelphia 24, Penna.

ATLAS

ATLAS ROLLER CHAIN

Ingersoll


NAZEL
HAMMER
TYPE B
NAZEL
ELECTRO-PNEUMATIC
FORGING
HAMMERS

IT'S *Yours* FOR THE ASKING

. . . Learn how others FORGE FOR PROFIT with NAZEL Electro-Pneumatic Hammers

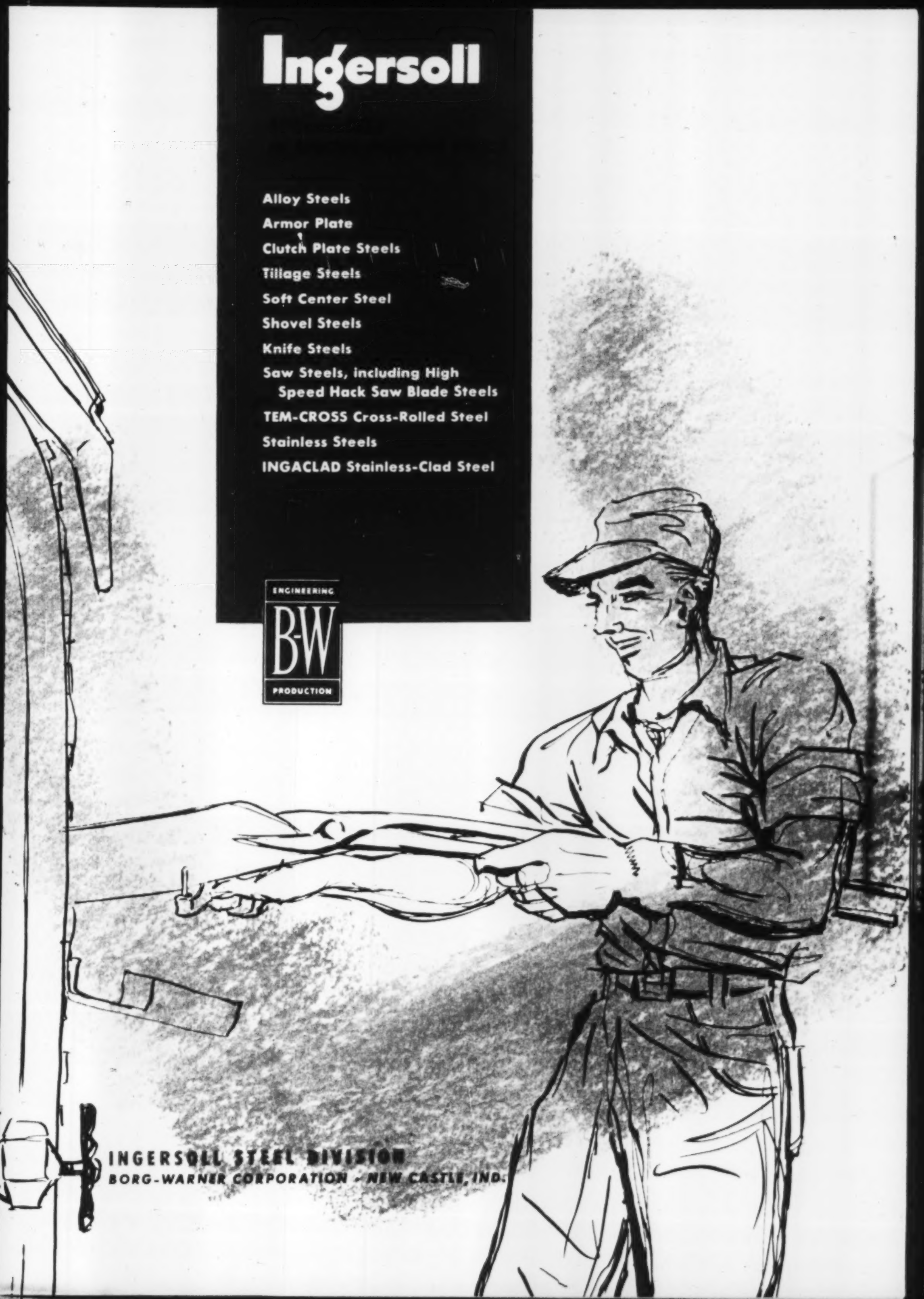
A copy of the *new* NAZEL Hammer Bulletin is yours merely for the asking. It contains clear, concise information and statistics on each of the four standard types of NAZEL Electro-Pneumatic Forging Hammers, with appropriate illustrations throughout.

Write for your copy on your business letterhead, today.

1836

LOBDELL UNITED COMPANY
WILMINGTON 99, DELAWARE
A SUBSIDIARY OF UNITED ENGINEERING AND FOUNDRY COMPANY

1952

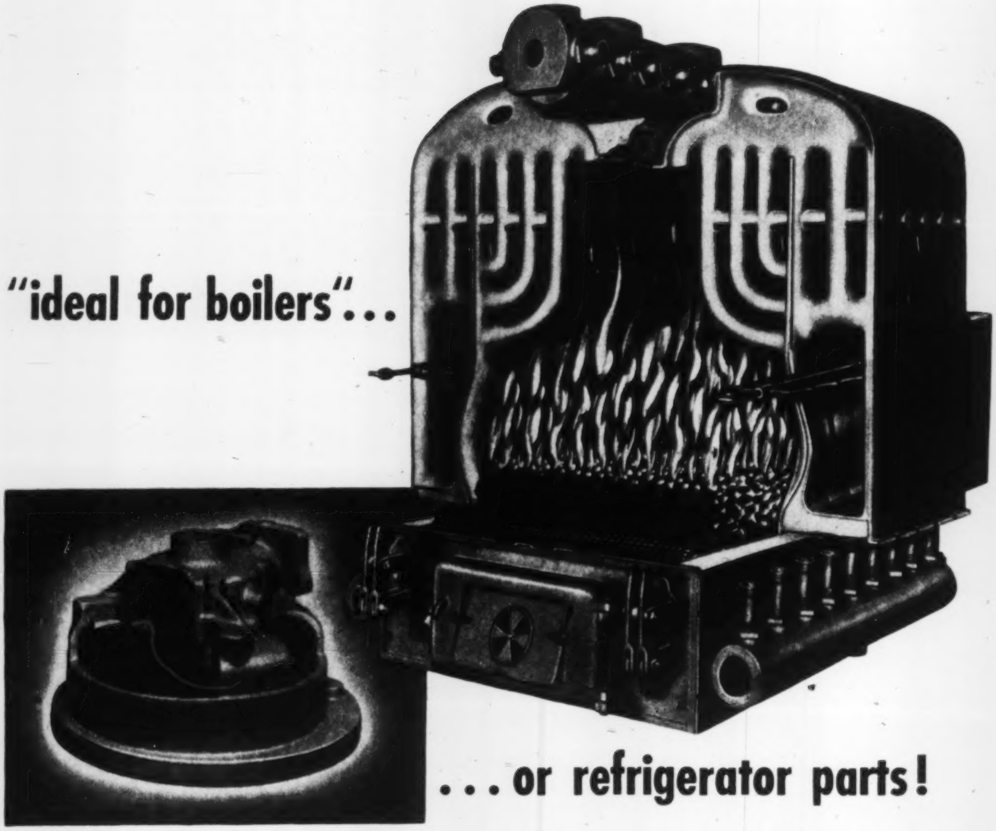


Ingersoll

- Alloy Steels
- Armor Plate
- Clutch Plate Steels
- Tillage Steels
- Soft Center Steel
- Shovel Steels
- Knife Steels
- Saw Steels, including High Speed Hack Saw Blade Steels
- TEM-CROSS Cross-Rolled Steel
- Stainless Steels
- INGACLAD Stainless-Clad Steel

ENGINEERING
B-W
PRODUCTION

INGERSOLL STEEL DIVISION
BORG-WARNER CORPORATION - NEW CASTLE, IND.



"ideal for boilers"...

...or refrigerator parts!

take advantage of the versatility of GRAY IRON!

"GRAY IRON IS IDEAL FOR BOILER CONSTRUCTION", says the manufacturer of this boiler, "because it resists to the greatest possible extent the numerous corrosive factors that attack boilers both internally and externally. Furthermore, many boilers receive indifferent or poor care. Consequently, a very durable material is necessary for their construction."

WHERE RESISTANCE TO HEAT, CORROSION, WEAR AND VIBRATION is required—for boilers or refrigerator parts—gray iron provides it, at an economical cost. For example, this manufacturer reports gray iron boilers that are still in service after 67 years, without major repairs.

SO CONSIDER GRAY IRON whenever you need a part that must be durable under adverse operating conditions—that's either plain or intricately shaped—gray iron provides a wide strength range, is easily castable and readily machinable. You'll find all these advantages in gray iron castings.

Make it Better with Gray Iron

Second largest industry in the metal-working field

SCRAP IS NEEDED FOR DEFENSE—KEEP IT MOVING!

GRAY IRON FOUNDERS' SOCIETY, INC.
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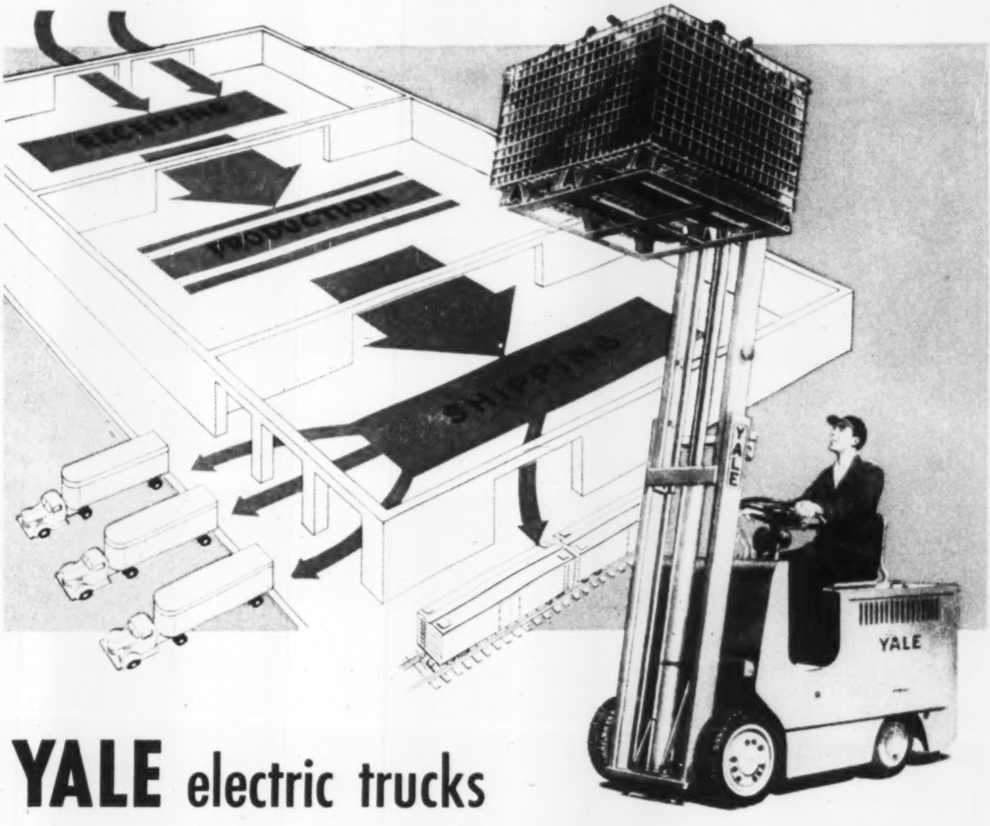

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THESE EXCLUSIVE YALE FEATURES KEEP TRUCK OVERHEAD DOWN

- Exclusive Hypoid Gears give greater drive power, longer drive life.
- Exclusive Involute Spline Drive Shaft, built for continuous resistance to wear-fatigue, outlasts all others.
- Special Rolled Lift Channels with lifetime sealed ball bearing channel rollers won't wear, won't spread — need never be replaced.
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YOU CAN SAVE up to 75% of your production, receiving, shipping and storage handling costs with dependable, longer-lasting YALE Electric Trucks. Discover for yourself the *extra* savings YALE Electric Trucks can bring you—in operating, maintenance and replacement costs. Fill out and mail the coupon today

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☐ Please have your local Representative call on me.

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"STEELSKIN" RESEARCH

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"REDSKIN" COPPER-COATING COMPOUND

PROFIT BY THESE ADVANTAGES!

1. Lower cost insures substantial savings.
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pany, Inc., Homer 2, N. Y.

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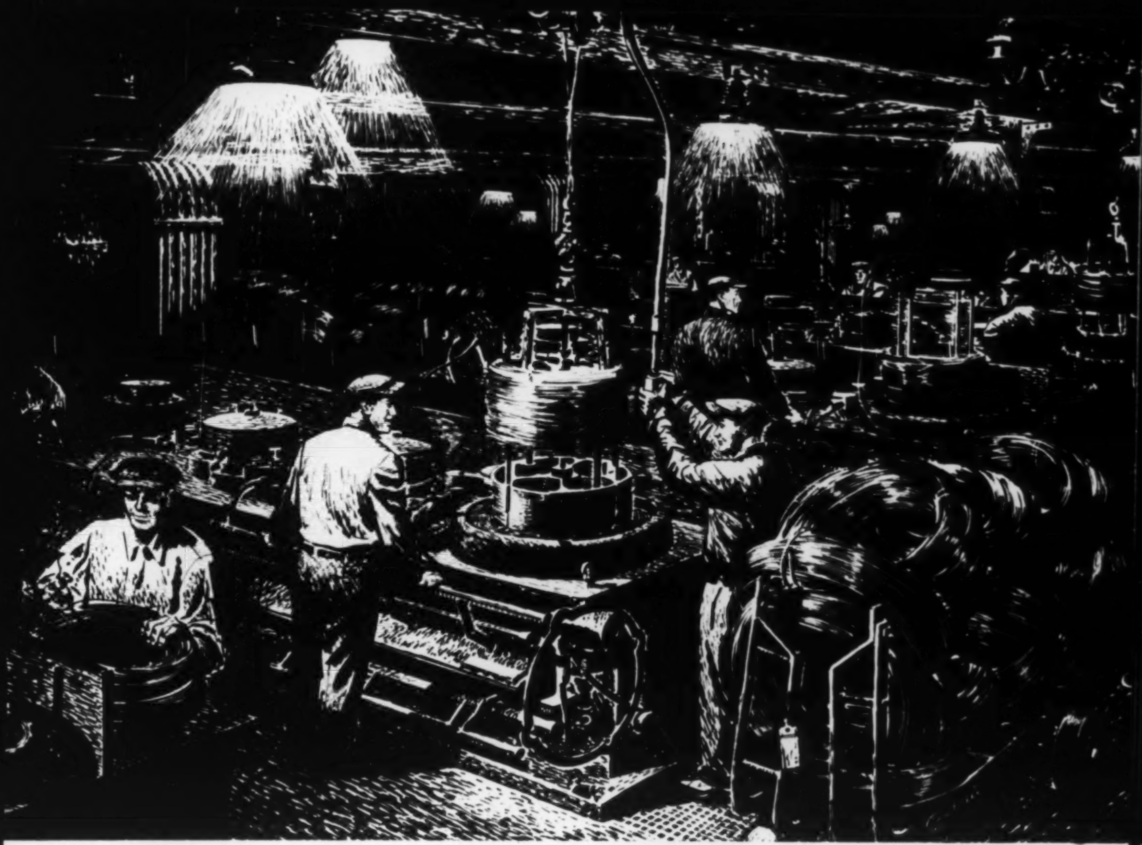


Wire Drawing *Scratchboard Drawing for Pittsburgh Steel Company by William Pendred*

Progress in Steel

Steel wire, one of the vital threads that holds civilization together, will soon be produced in even greater quantity at Pittsburgh Steel as a result of the company's planned Program of Progress which will increase its steel-making capacity fifty percent by July, 1952.

Pittsburgh Steel Company today is one of the largest producers of wire in the United States. Shown above is a small segment of the wire drawing department at the Monessen Works. Here, high-quality steel rods are drawn through a series of tungsten-carbide dies to reduce their diameter to the desired wire gauge. With more steel available, it will be possible to increase the wire production of this department plus Pittsburgh Steel's subsidiary, the Johnson Steel & Wire Company with plants at Worcester, Mass.; Akron, Ohio; and Los Angeles, Calif.

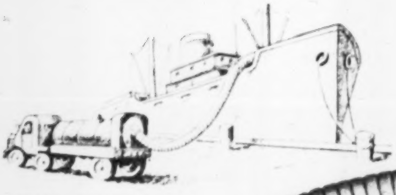
The precision wire produced in all these operations serves you and industry in many ways—as special oil-tempered spring wire for tanks, planes, military vehicles, automobiles, agricultural implements, locomotives and household appliances. Pittsburgh barbed wire protects our troops and fences our farms. Wire is also woven and welded into fence to protect military installations, factories, homes and farms. Special cold-heading wire is used for forming into rivets, bolts, screws and thousands of small mechanical parts and fasteners. Other Pittsburgh wire goes into textile looms and such every-day items as automobile tires, paper clips, musical instruments, coat hangers and even bobby pins.

The demand for more wire of all kinds grows daily. Likewise, the nation needs more tubular products, more hot and cold rolled sheet and strip. Pittsburgh Steel's Program of Progress is designed to help meet this demand. The program entails expanding the blast furnace and open-hearth furnaces to provide more steel capacity. This required the installation of a new high-lift blooming-slabbing mill which was completed last year. It includes the construction of facilities for producing hot and cold rolled strip and sheet at the Allenport Works.

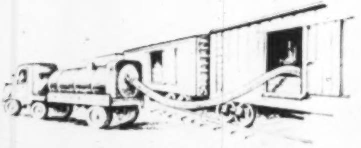
At war and at peace, civilization depends upon the millions of tons of steel produced in the United States each year. The industry recognizes the vital necessity of providing more steel, better steel, if civilization is to survive. That is why the Program of Progress at Pittsburgh Steel Company, an important part of the steel industry's vast expansion program, is being rushed to completion.

Pittsburgh Steel Company

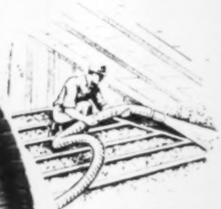
Pittsburgh, Pennsylvania



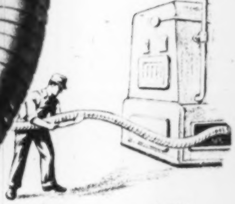
SHIP UNLOADING



GRAIN UNLOADING



INSULATION BLOWING



ASH REMOVAL

8" Penflex #20 galvanized steel tubing attached to Sutorbilt blower at Procter & Gamble dock on west coast.

PENFLEX TAKES THE BITE OUT OF SHARP-TOOTHED CARGOES

PENFLEX FLEXIBLE TUBING MOVES ABRASIVE COPRA—PROVIDES SMOOTH-FLOWING, FLEXIBLE TRANSMISSION —RUGGED RESISTANCE TO WEAR

Unloading abrasive copra is a tough ship-to-shore operation which often spells quick death for conveyor tubing. Jagged chunks of copra eat away ordinary metal tubing—tear rubber hose to shreds.

Wherever "smooth throat" Penflex tubing is on the job, roughest cargoes go down easily. Penflex tubing—tough, smooth and flexible—flows roughest materials evenly . . . eliminates costly clogging and stoppages. And Penflex means flexibility too. Hose moves freely in the hold, absorbs vibration from machines, takes up movement of the ship due to tide changes.

For help with all your tough tubing problems, just call-in your Penflex engineer. Penflex makes a complete line of four-wall, interlocked and seamless welded corrugated tubing—from 1/8" I.D. up . . . automatic barrel fillers, accessories, fittings, and pneumatic rivet passers. Write for illustrated folder "Flexineering," containing valuable flexible tubing data for your particular product application.

Pennsylvania Flexible Metallic Tubing Company, Inc., 7219 Powers Lane, Phila. 42, Pa.
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There's a Mattison to Grind it.

● The comprehensive "Mattison Line" of grinders enables Mattison Machine Works to work with you on all your surface, face and disc grinding problems. These machines are made in various types to handle a wide range of work and enables our engineers to recommend the particular type of grinder that will give you maximum accuracy, production and economy.

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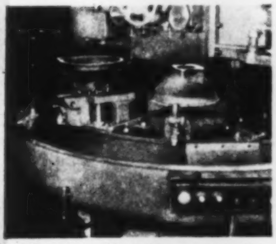
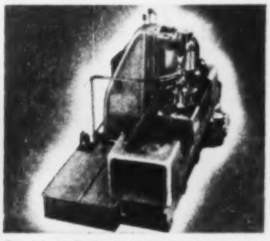
For catalogs on any of the types shown or if you would like a copy of the general bulletin, let us know and we'll gladly send them to you.



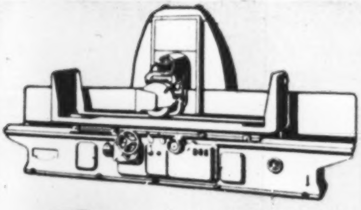
200 Transmission Case surfaces ground per hour on Mattison (Hanchett Type) Rotary Automatic Grinder. A special 8-station mechanical fixture permits one operator to grind each end of this large 35 lb. casting, flat and parallel. Stock removal .050".

Grinding cast-iron cams — 5" diameter, 1½" thick — stock removal, each side .030". Production, 120 surfaces per hour on Mattison (Hanchett Type) Rotary Surface Grinder.

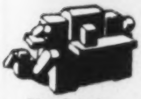
2½ ton machine-bed ground in 60% less time on Mattison Precision Surface Grinder than required by former method, hand scraping.



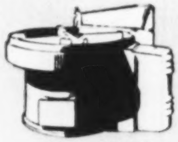
The No. 24 Duplex is equipped with two rotary tables. Where loading time is about the same as grinding time this machine can practically double production.



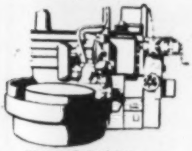
Precision Surface Grinders Horizontal Spindle



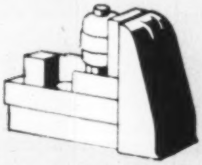
Disc Grinders, Double Spindle Type



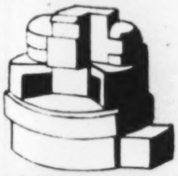
Vertical Spindle Disc Grinders



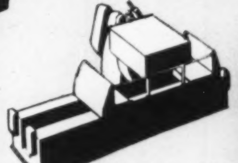
Plano Grinders, Rotary Table Type



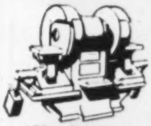
Rotary Table Surface Grinders



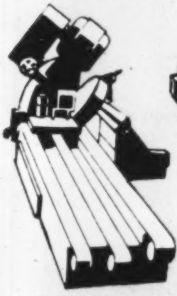
Automatic Rotary Surface Grinders



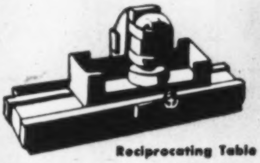
Reciprocating Table Face Grinders



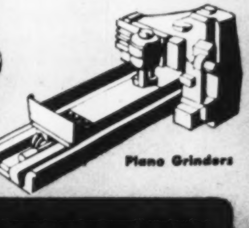
Disc Grinders, Single Spindle Type



Face Grinders, Traveling Wheel



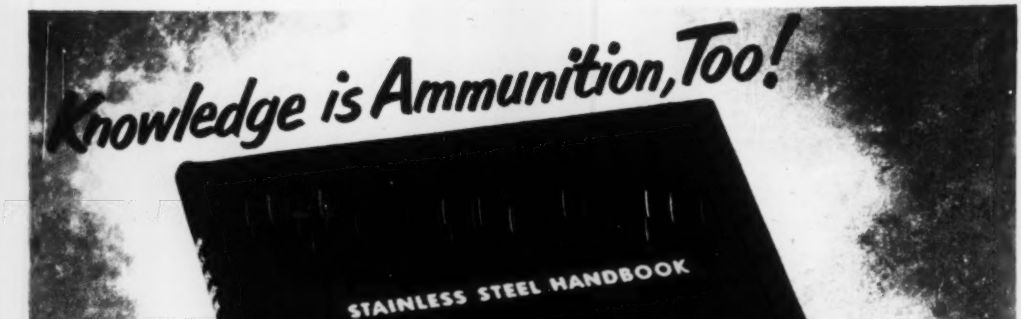
Reciprocating Table Surface Grinders Vertical Spindle



Plano Grinders

MACHINE WORKS

ROCKFORD · ILLINOIS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Here's 124 Pages of Valuable Data on STAINLESS STEEL

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Your copy of the Stainless Steel Handbook will be sent—*without charge*—upon request. Our only stipulation: please make your request upon your company letterhead. ● Write Allegheny Ludlum Steel Corporation, Oliver Bldg., Pittsburgh 22, Pa.

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You can make it **BETTER** with

Allegheny Metal

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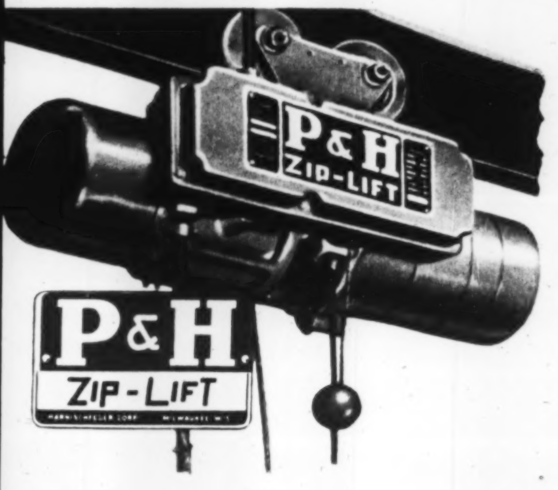
Free your hands with a ZIP!



HANDLE IT "THRU-THE-AIR"—FASTER—FOR LESS

Skilled hands shouldn't be load-lifters. There's more important work for them to do — more profitably!

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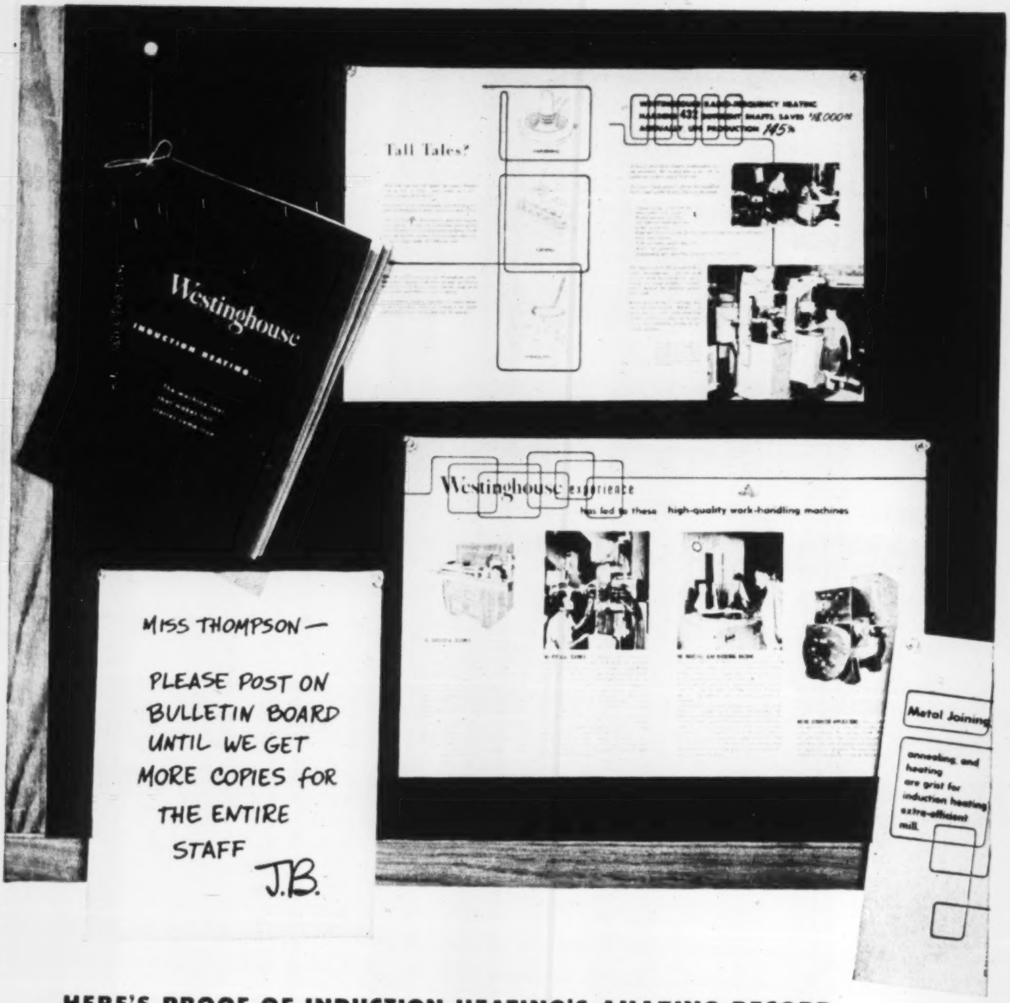
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WESTINGHOUSE RADIO FREQUENCY HEATING HARDENS 432 DIFFERENT SHAFTS, SAVED $18,000 ANNUALLY, UPS PRODUCTION 145%
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annealing, and heating are grist for induction heating's extra-efficient mill.

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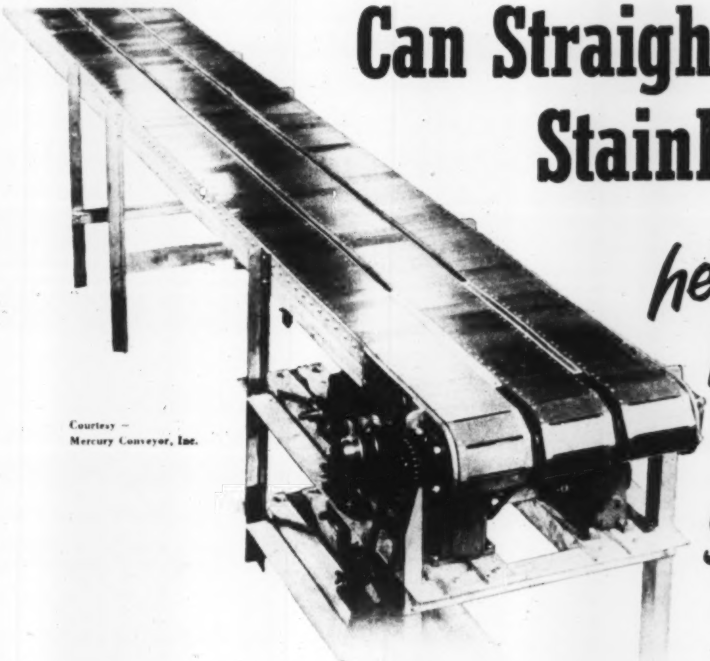
INDUCTION HEATING

J-92235

Can Straight-Chrome Stainless

help you beat the nickel shortage?



Courtesy —
Mercury Conveyor, Inc.

If you're seeking to beat the nickel shortage – this all-stainless conveyor will carry a valuable suggestion for you. The manufacturer, like many others serving the food industry, had long used nickel-bearing stainless steel to make a completely sanitary unit.

Recent nickel controls, however, greatly curtailed production – and prompted a decision to utilize substitute materials. But there were shop and fabricating practices to consider – in addition to the appearance, sanitation and service life of the final product.

Frasse Technical Service was called in for advice. After study, Frasse engineers recommended Type 430, a straight-chrome stainless that not only met all requirements – but was freely available from Frasse warehouse stock.

New steels and new uses for established grades are the continuing study of Frasse engineers. Get their analysis of your "hopeless" steel supply shortage – chances are they may come through with a replacement more readily obtained. No obligation. Just call or write your nearest Frasse office today. *Peter A. FRASSE and Co., Inc., 17 Grand Street, New York 13, N.Y. (Walker 5-2200) • 3911 Wissahickon Avenue, Philadelphia 29, Pa. (Baldwin 9-9900) • 50 Exchange Street, Buffalo 3, N.Y. (Washington 2000) • P.O. Box 1267, Syracuse 1, N.Y. (Syracuse 73-5241) • Lyndhurst • Hartford • Rochester • Baltimore.*

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means more steel—have you cleaned house?

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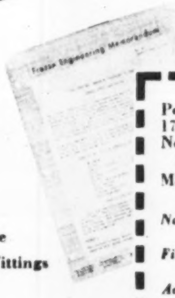

Read About Type 430 Stainless Steel — The Logical Substitute For Types 302 and 304.

New Frasse Engineering Memorandum No. 8 describes properties and procedures essential for your consideration of Type 430. Gives data on forming, drawing, welding, annealing and corrosion resistance. Send for your free copy today.

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Please send me a complimentary copy of your new Engineering Memorandum on Straight-Chrome Stainless Steel.

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[illegible]

This question—not as naive as it seems—directs your attention to a very important consideration: the necessity for conserving, as much as you can, whatever material you now have—particularly copper tubing.

As you know, all metals are in short supply. You must endeavor not only to protect your present installations, but also be more critical in the selection of any new supplies you contemplate buying.

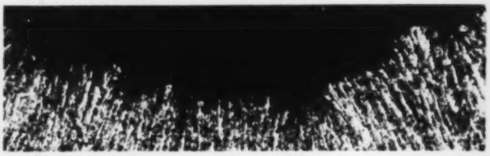
By specifying Wolverine in your purchases of copper and copper base alloy tubing, or for your fabricated tubular parts, you will assure yourself of long, continuous dependable service; and meanwhile also help the national preparedness program. Furthermore, you will relieve yourself of many worries induced by unwarranted breakdowns and replacements.

Examine the three photomicrographs here which show a comparison of the relative construction and surfaces of different tubes. You can readily detect the very smooth surface shown in Specimen C (Wolverine tube) which obviously provides for a smooth flow of liquids and gases.

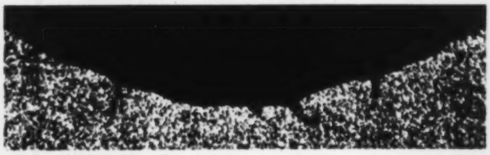
Wherever you need copper tubing, use Wolverine—the tube that is quality-controlled from ore to finished product—to give you the kind of service you expect. **WOLVERINE TUBE DIVISION**, Calumet & Hecla Consolidated Copper Company, Incorporated, *Manufacturers of Seamless Non-ferrous Tubing*, 1429 **CENTRAL AVENUE, DETROIT 9, MICHIGAN.**

[illegible]

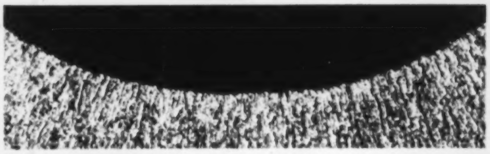
All 200X Magnification



SPECIMEN A—*Note roughness of bore.*



SPECIMEN B—*Overlap defect.*



SPECIMEN C—*Smoothness.*

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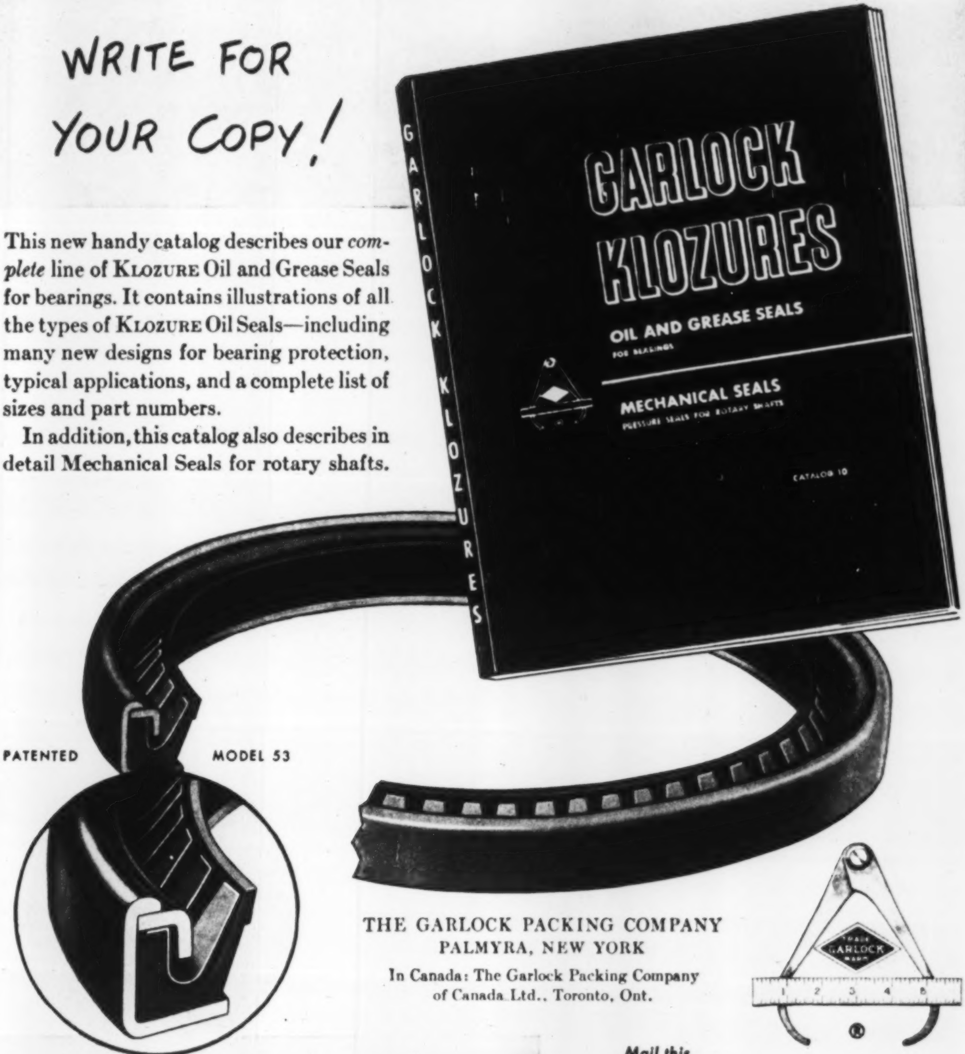
This new handy catalog describes our *complete* line of KLOZURE Oil and Grease Seals for bearings. It contains illustrations of all the types of KLOZURE Oil Seals—including many new designs for bearing protection, typical applications, and a complete list of sizes and part numbers.

In addition, this catalog also describes in detail Mechanical Seals for rotary shafts.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GARLOCK KLOZURES
OIL AND GREASE SEALS
FOR BEARINGS
MECHANICAL SEALS
PRESSURE SEALS FOR ROTARY SHAFTS
CATALOG 10
PATENTED
MODEL 53

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In Los Angeles his name is Joe, in Cleveland it's Harvey. Like his "brothers" in principal cities throughout the country, he is *your* key to lower steel inventories; more helpful information, *complete assistance* in the use of tool, alloy, or stainless steel. He's the fellow on the telephone order desk at your nearest Carpenter MILL BRANCH WAREHOUSE.

The first time you call him, you'll discover you're getting something *more* than "just steel service". For he is backed by a MILL BRANCH WAREHOUSE organization. It embraces "trouble-shooting service" right in your own plant. It is backed by trained delivery crews and modern equipment to process orders, fast.

Most important—it is *part and parcel* of the specialty Mill in Reading. Every time you call your Carpenter MILL-BRANCH WAREHOUSE you benefit from Mill Laboratory and Metallurgical Help, Mill Quality Controls—*comprehensive Mill Service*.

Truly, it's almost like having a *specialty* steel Mill right next to your receiving dock!

Whenever you want specific job recommendations, help with a problem or top-quality steel, get it by calling Carpenter. Try it and see. Simply pick up your phone and talk to the man on the order desk at your nearest Carpenter MILL-BRANCH WAREHOUSE or Distributor. The Carpenter Steel Co., 139 W. Bern St., Reading, Pa.

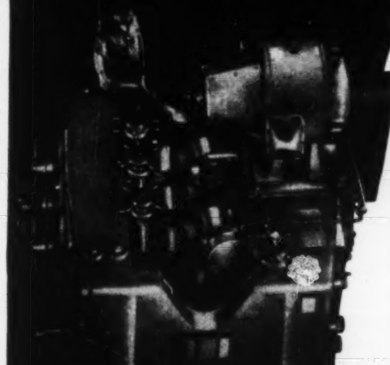
CALL *Carpenter*

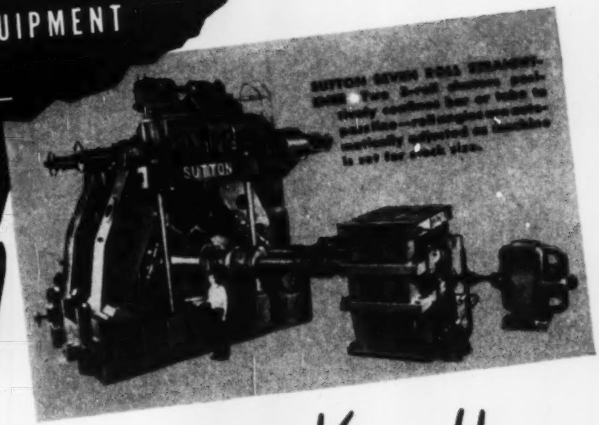
for Mill-Branch Warehouse Service

SPECIALTY TOOL • ALLOY • AND • STAINLESS STEELS

STRAIGHTENING EQUIPMENT

by—





SUTTON SEVEN ROLL STRAIGHTENER ● Two 3-roll clusters positively confine bar or tube to pass line—roll angles are automatically adjusted as machine is set for stock size.

..... it's the *Know How* that counts

Sutton has specialized in straightening equipment for 35 years! Sutton Straightening Machines are built in all sizes for bars and tubes from 1/8″ to 18″ in diameter and operate at speeds up to 1000 feet per minute. Pictured are representative examples.

● With
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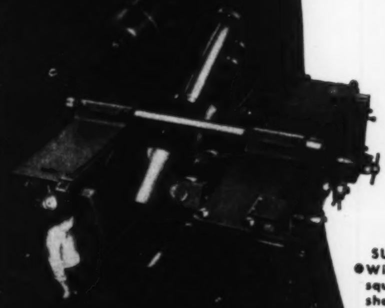

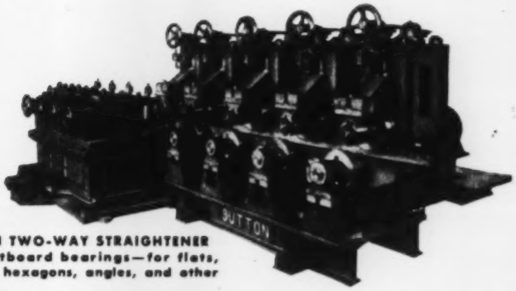

SUTTON TWO-WAY STRAIGHTENER
● With outboard bearings—for flats, squares, hexagons, angles, and other shapes.

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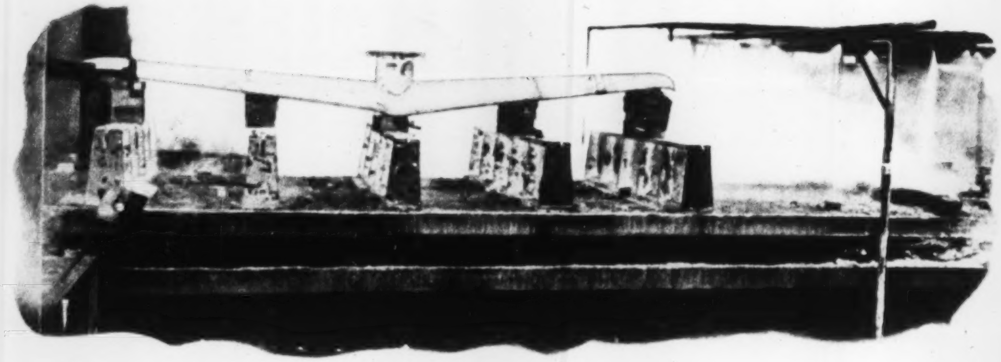
ROTARY CLEANERS, HEAVY DUTY UNIVERSAL JOINTS, ROLLS

BELLEFONTE, PENNSYLVANIA

This LUMNITE* car-top is
WATER-QUENCHED at 2200° F.!



MISSOURI may be the "Show Me" state. But even after they're shown, some Missourians are still amazed by the way this Lumnite car top absorbs thermal shock at Nooter Corp., St Louis.

From a fiery 2000° F. to 2300° F. annealing furnace, Nooter's big car is rolled under a quenching bath of cold water. A terrific thermal shock! Yet the car top is in excellent condition after seven months service. It may last for years. Some Lumnite car tops have stayed in service several years!

Working with Lumnite fieldmen, Nooter plant officials developed their car top. It has 82 sections, approximately 24" wide, 36" long, 9" thick. It's made from a mixture of Lumnite, crushed fire-brick and Topaz admix. Beneath it is a 5" thick section of insulating concrete. Nooter officials are so pleased with the car tops' performance they are planning to use Lumnite refractory concrete in the walls, sprung-arch roof, foundation, and base slab of a new annealing furnace.

Lumnite calcium-aluminate cement has a proved time and cost-saving record. It gives consistently good performance under severe conditions.

* * *

IF YOU'RE IN A HURRY to place practically any refractory . . . use Castable Refractories made with Lumnite. They reach full service strength in 24 hours or less! Castables are easy to use. No skilled labor necessary. They come to you dry, a balanced mixture of aggregates and Lumnite calcium-aluminate cement. All you do is add water and pour into place. Your job will be finished and into production—fast! Buy them from your refractory dealer.

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For more information write: Lumnite Division, Universal Atlas Cement Company, (United States Steel Corporation Subsidiary), 100 Park Avenue, New York 17, N. Y.

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"LUMNITE" is the registered trade mark of the calcium-aluminate cement manufactured by Universal Atlas Cement Company.

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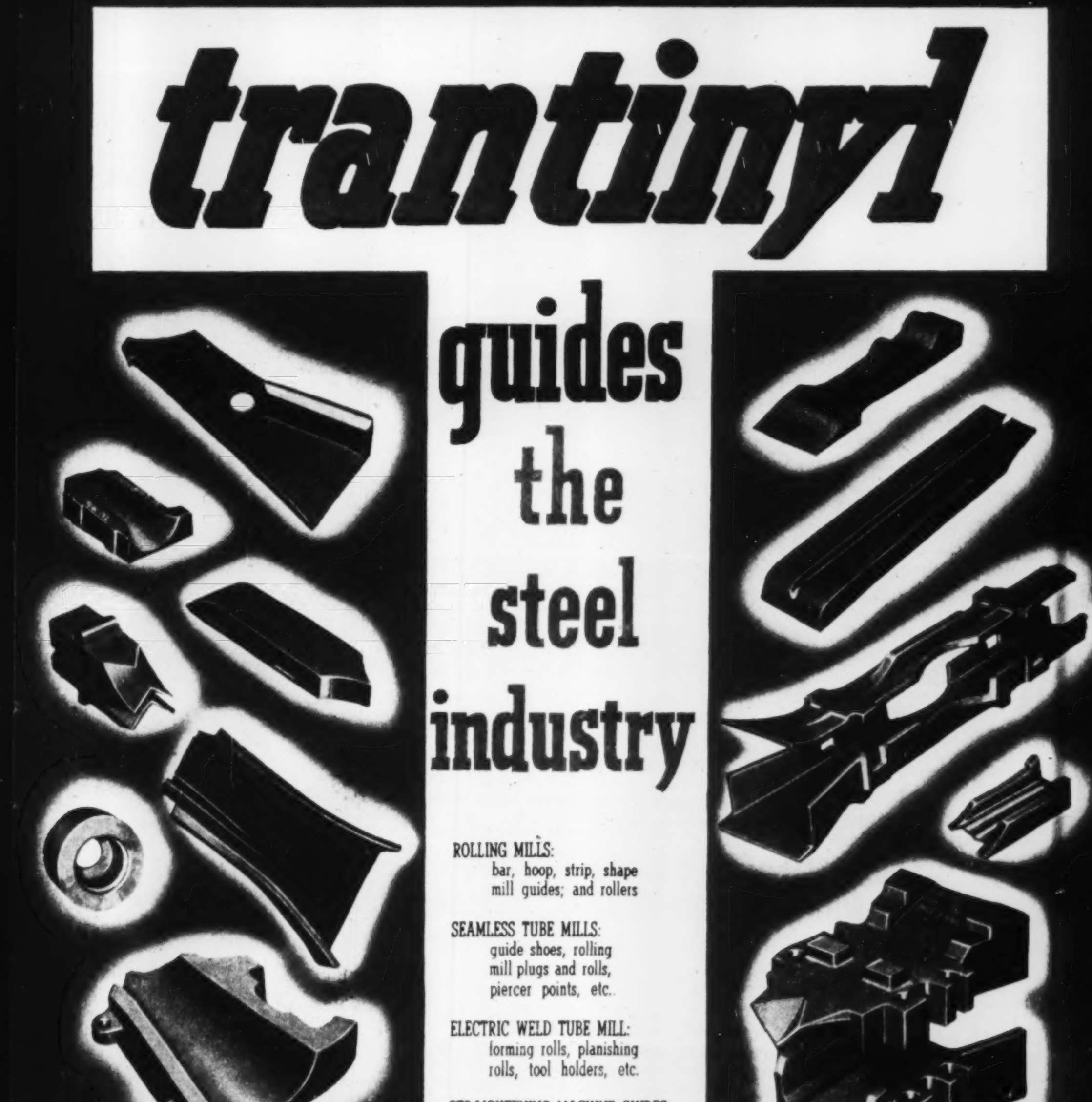

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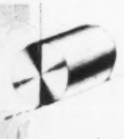
ROLLER ENDS, precisely square to avoid end-rub, oscillation and side-shock.



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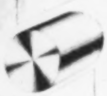

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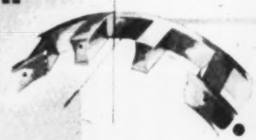

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Let's examine your bearing problems together to determine exactly the kind of bearings you need. Our years of specialized bearing experience, plus complete engineering and metallurgical services, are always at your command. No cost. No obligation. Just write or wire Rollway Bearing Co., Inc., Syracuse, N. Y.

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Complete Line of Radial and Thrust Cylindrical Roller Bearings

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and SAVED
$50.00 a TON...
...on this
Winch Shaft with—

GROUND and POLISHED STRESSPROOF®

The cable drum shaft of this Army truck winch was formerly made from 4140 alloy steel—cold-drawn, heat-treated, stress-relieved, ground, and polished. It was difficult to machine, and expensive. Several years ago this alloy bar was replaced with Ground and Polished STRESSPROOF at a considerable saving. Steel costs were *substantially* lowered—machining time was reduced. As a result, the over-all savings amounted to $50.00 for every ton of steel used.

This is typical of the sensational savings made possible with Ground and Polished STRESSPROOF—the finest ground bar steel produced. This bar eliminates many costly manufacturing operations because of its unique combination of five important qualities in the bar: High Strength . . . Excellent Wearability . . . Minimum Warpage . . . Accurate, Polished Surface . . . and Machinability fully 50% faster than heat-treated alloys of the same hardness!

STRESSPROOF
IS PLAYING A VITAL ROLE IN NATIONAL DEFENSE!

A very large proportion of STRESSPROOF production, today, is going into defense jobs. However, sample bars are available for testing purposes.

La Salle STEEL CO.
1414 150th STREET, HAMMOND, INDIANA
Manufacturers of the Most Complete Line of Cold-Finished and Ground and Polished Bars in America

Keeping one eye on the steel picture?

We will be completely open and aboveboard with you.

There is little current improvement in the steel situation—and you are probably as much aware of it as we are.

Our mills are producing every ton of steel to capacity, but we still cannot fill all the requirements of our old customers or solicit any new orders. Defense requirements and government marketing regulations naturally come first.

But you can bank on this. Every ton of steel we produce today is as fine as strict metallurgical control can make it. And we can and will continue to be completely honest about our ability to deliver. When we make a commitment, you can rely on shipment as promised, in the specifications and with the quality you can always expect from us.

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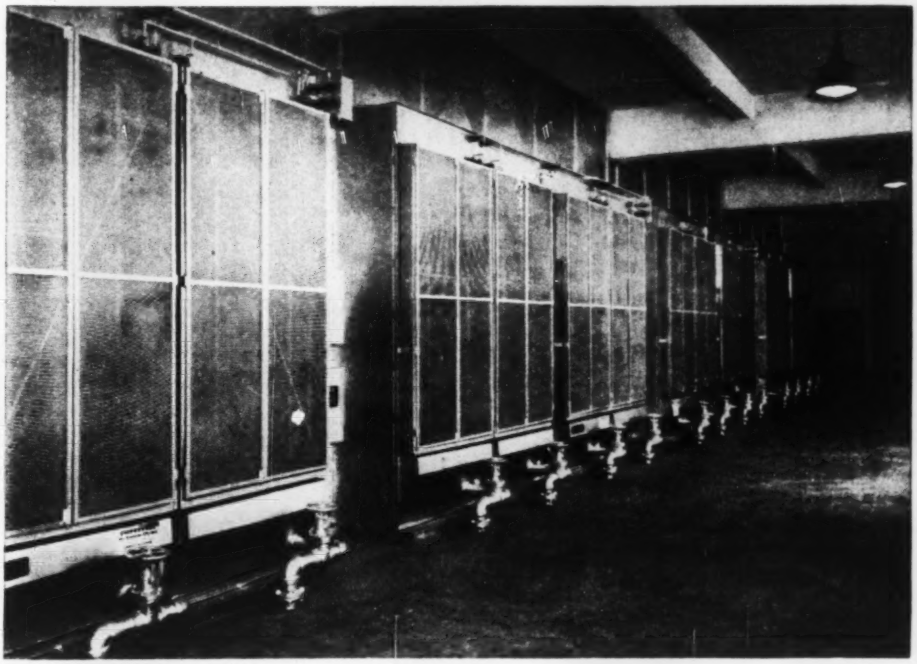
today's best buy is better air!



AAF Electro-Matic *Precipitators totaling 175,000 CFM*

Electro·MATIC super-clean air

. . . MEANS LESS MAINTENANCE FOR MILL MOTORS!

STEEL MILL MOTORS perform more efficiently with less maintenance, if the cooling air is *super-clean.* Electro-Matic*, the *only* automatic, self-cleaning, electronic precipitator is widely used by steel mills to provide dust-free air for their motor rooms.

Highest cleaning efficiency is maintained by the Electro-Matic over a wide range of particle sizes, from smoke to the largest air-borne material. Due to the special design and spacing of its collector plates the filter curtain is non-clogging and insures uniform air volume. Also, the Electro-Matic's exclusive features of automatic operation and self-cleaning, reduce servicing to routine maintenance and insure maximum operating efficiency at all times.

The filters are standardized, self-contained sections, easily installed in various arrangements to meet any air volume requirements. Like so many in the steel industry, the Electro-Matic installation above is equipped with oil clarifiers, which continuously clean the Viscosine and simplify sludge removal.

With thirty years experience in solving dust problems, AAF makes the *only* complete line of air filters and electronic precipitators. If *super-clean* air for motor rooms or other operations is one of your problems, call your nearby AAF representative or write today for Engineering Bulletin No. 250-E.

**ELECTRO-MATIC Automatic Electronic Precipitator.*

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FOR MORE PRODUCTION PER POUND try Sandvik Spring Steel

SANDVIK PRECISION AND UNIFORMITY CAN GIVE YOU THIS THREE-WAY PRODUCTION BONUS

1. Sandvik's precision means strip rolled closer to *exact* size . . . gives you more parts per pound.
2. Sandvik steel cuts rejects by being consistently within specified gauge, coil after coil—lot to lot.
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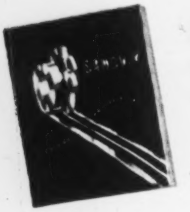
Sandvik Swedish cold-rolled, high carbon strip steel is available:

- **Precision-rolled in thicknesses from .001"**
- **In straight carbon and alloy grades**
- **In special analyses for specific applications**
- **In more than 800 stock sizes**
- **Annealed, unannealed or hardened and tempered**
- **Polished bright, yellow or blue**
- **With square, round or dressed edges**

Phone, wire or write your nearest Sandvik office for further information or technical help.

SOME SANDVIK SWEDISH SPECIALTY STRIP STEELS—Steel for Textile Machine Parts. Band Saw Steels; Metal Band, Wood Band and Butcher Band • Camera Shutter Steel • Clock and Watch Spring Steels • Compressor Valve Steel • Doctor Blade Steel • Feeler Gauge Steel • Knife Steels • Razor Blade Steel • Reed Steels Shock Absorber Steel • Sinker Steel • Spring Steels • Trowel Steel • Vibrator Reed Steel, etc.



FREE! SANDVIK CATALOG

DESCRIBES 785 SPRING STEEL SIZES

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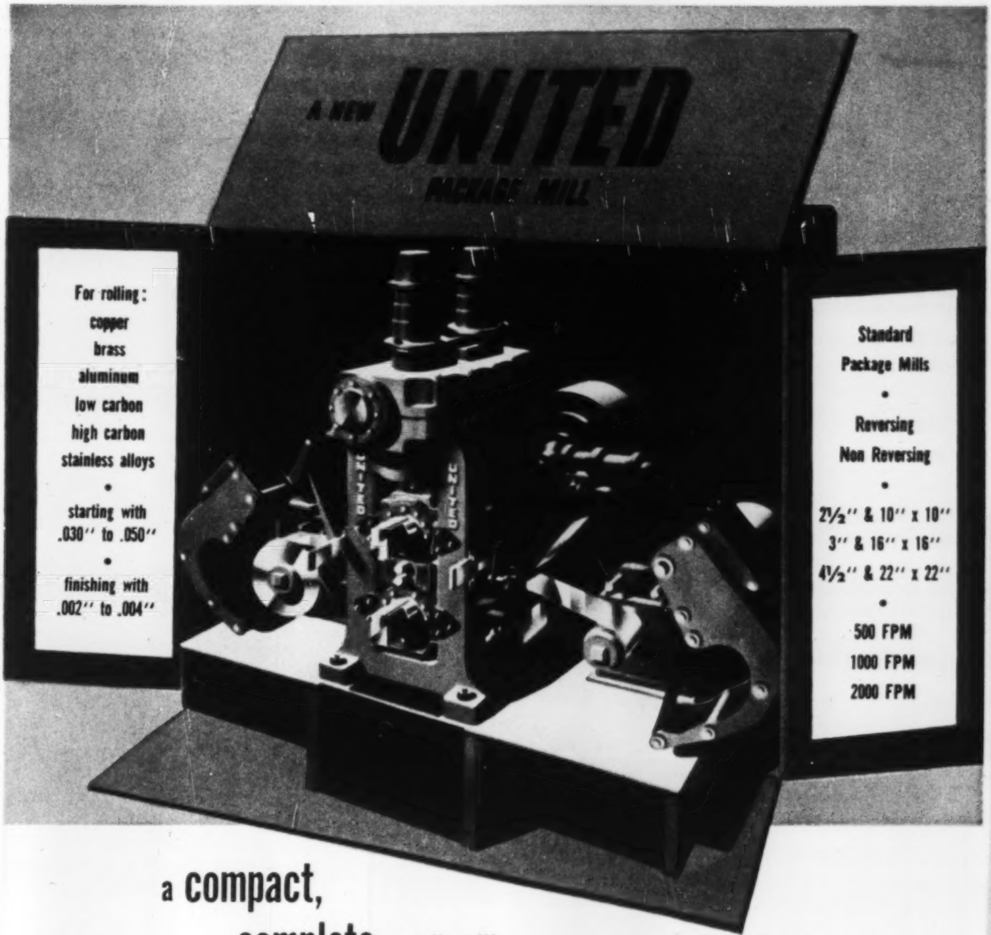
A NEW UNITED
PACKAGE MILL
For rolling:
copper
brass
aluminum
low carbon
high carbon
stainless alloys
starting with .030'' to .050''
finishing with .002'' to .004''
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Reversing
Non Reversing
2½'' & 10'' x 10''
3'' & 16'' x 16''
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UNITED
UNITED

a compact, complete small mill. No cellars or elaborate foundations needed

TO meet the need of many manufacturers for a small, compact, inexpensive mill for the cold rolling of narrow, thin strip, UNITED developed, and is now offering, a NEW, COMPLETELY INTEGRATED "PACKAGE MILL."

Each unit is furnished fully equipped with roller bearing mounted rolls, recirculating rolling coolant system, mill guides, tension reels, belt wrappers if desired, strippers, motors and drives, all mounted on a fabricated base which serves also as a rolling coolant reservoir. The mill illustrated is a reversing type with motorized screwdown.

If a small, compact, completely self-contained "Package Mill" of this type fits into your present operations or contemplated expansion, consult us. Your inquiry will bring complete information at no obligation.

- Mill can be equipped for one way rolling by using a simple coil box instead of a reel.
- Sleeve type or collapsing mandrels are optional with or without grippers to meet user's requirements.
- Hand screwdown can be furnished instead of motorized screwdown as shown.

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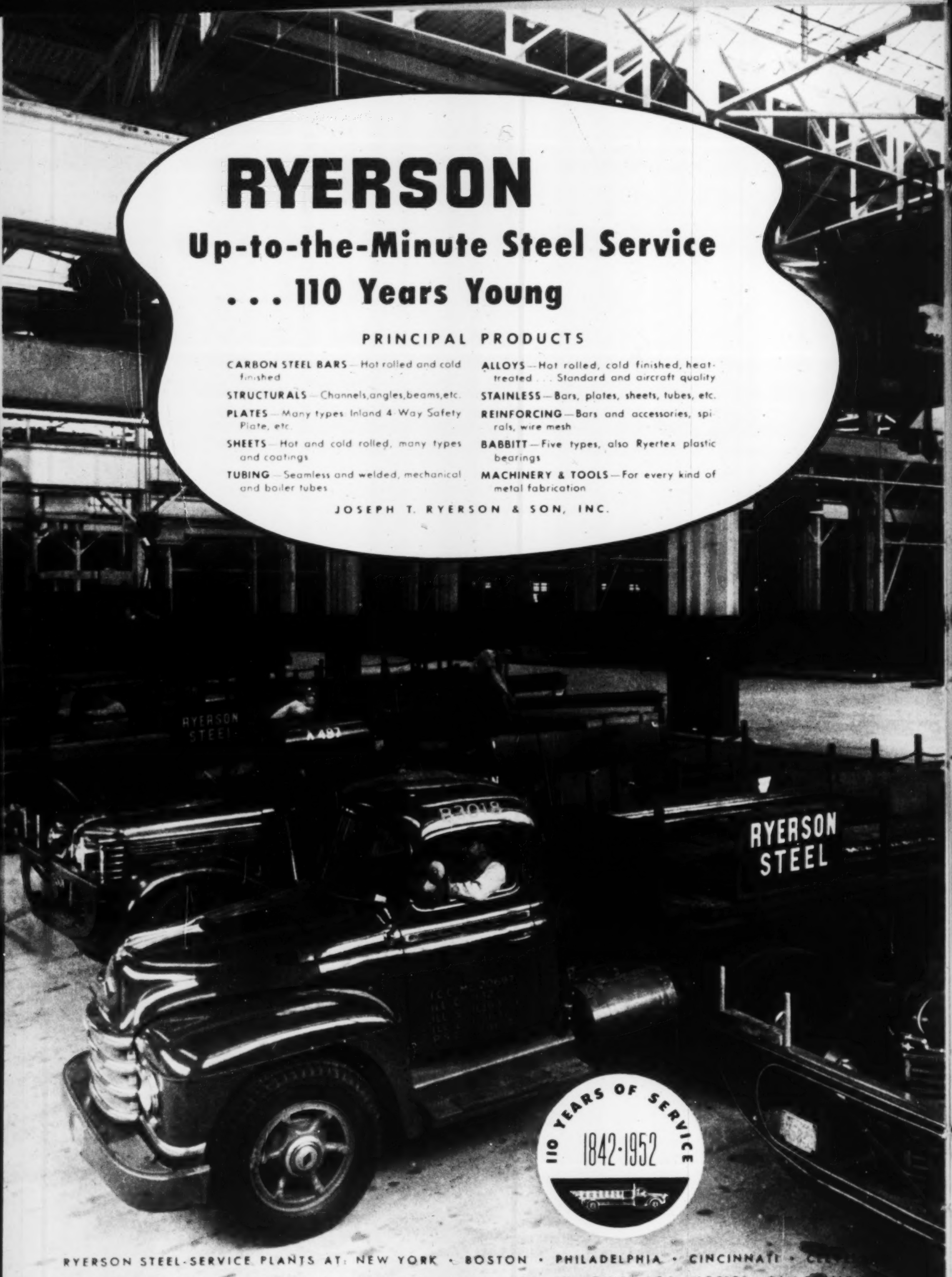
Designers and Builders of Ferrous and Non-Ferrous Rolling Mills, Mill Rolls, Auxiliary Mill and Processing Equipment, Presses and other heavy machinery. Manufacturers of Iron, Nodular Iron and Steel Castings and Weldments.



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CARBON STEEL BARS—Hot rolled and cold finished

STRUCTURALS—Channels,angles,beams,etc.

PLATES—Many types Inland 4-Way Safety Plate, etc.

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TUBING—Seamless and welded, mechanical and boiler tubes

ALLOYS—Hot rolled, cold finished, heat-treated ... Standard and aircraft quality

STAINLESS—Bars, plates, sheets, tubes, etc.

REINFORCING—Bars and accessories, spirals, wire mesh

BABBITT—Five types, also Ryertex plastic bearings

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STEEL

The Metalworking Outlook

January 7, 1952

No. 1 Bulwark: Capital Expenditures

Business will be good in 1952, but probably better in the first half than the second. That's because the major bulwark for the present boom, new plant and equipment expenditures, will reach a peak in the first half, then level out. Total outlays for the year of about $26.5 billion will be higher in dollars than 1951's $25 billion expenditures because of anticipated 3 to 5 per cent inflation; physical outlays will be just about the same.

No. 2 Bulwark: Defense Spending

Defense spending, the second major support for the economy, is now a little behind expectations, but may pick up by midyear, especially if the administration wants to prime the business pumps to help prosperity in this presidential election year. Military spending has been hovering around the annual rate of $40 billion for the past three months, a far cry from the $49 billion goal expected for fiscal 1952. The target for fiscal 1953 is $65 billion, $62 billion for fiscal 1954.

WHAT'S AHEAD IN METALWORKING IN 1952 ?

HERE'S A CAPSULIZED FORECAST OF THINGS TO COME

No. 3 Bulwark: Steel Production

Steel production, the third chief buttress, will be high, but many steel men—traditionally conservative—think we will do well to match in 1952 the 1951 output of 105.1 million ingot tons. Steel users think we will need about 110 million tons. Steel men argue that 1952 metalworking output gains will be in atomic energy products and electronic production where proportionately little steel is used. Gross national product (value of all goods and services) may rise from $321 billion in 1951 to $340-$345 billion in 1952. The FRB index averaged nearly 220 in 1951, may hit 230-235 in 1952. Metalworking sales, at $102 billion last year, should reach $108 or $110 billion in the next 12 months.

Industry-by-Industry Prospects

Steel consuming industries likely will fare about this way:

CONSTRUCTION—The $22 billion rate in 1951 will probably fall to $20 billion in 1952. Housing starts will drop from 1.1 million last year to 900,000 this 12 months. Commercial and institutional building will decline in about the same ratio. The peak in industrial construction has already been passed.

AUTOMOBILES—About 4 million cars and 1,250,000 trucks and busses will be turned out in the next 12 months, compared with 5,340,000 cars and 1,425,000 trucks and busses in 1951. Judging from first quarter allotments, the industry could produce slightly more than that but it will be held down by non-CMP materials scarcities such as nickel, not to mention a sluggish demand.

RAILROADS—Financing problems and materials scarcities will put the damper on expansion and modernization programs for the Class I roads, although equipment buying will still be good. As its looks now, between 6000 and 7000 freight cars and 250 diesel locomotives will be delivered monthly and about 320,000 tons of rails will be laid quarterly. The roads could probably use 9000 or 10,000 freight cars and 400 diesels a month, plus about 385,000 tons of rail a quarter.

SHIPBUILDING—Shipbuilding in 1952 will be about the same as in 1951—a minor phase of total metalworking production.

AIRCRAFT—Substantial production gains can be expected in the next 12 months. The shortage in the industry is engines, not airframes. Electronic parts makers can anticipate the highest proportional gains because more than 70 per cent of the cost of the average military aircraft today is for such equipment. If we get a 143-group air force, two years will be required to build up such an organization.

OIL AND GAS EQUIPMENT—Here's one phase of the capital expansion program that will not level out in 1952, that will be limited only by the capacity to produce pipe and other oil country goods.

MINING, QUARRYING AND LUMBERING—Peak activity can be expected here, too, especially in mining and taconite developments.

MACHINERY AND TOOLS—Peak production, especially of machine tools, will characterize most of the year. Output, which will push new plant and equipment expenditures slightly above the 1951 dollar level despite a drop in industrial construction, should be equal to or a shade better than the 1951 physical level, up in dollars to extent of inflation.

ELECTRICAL EQUIPMENT—This phase of metalworking will be limited only by the capacity to produce. Utility buying is heavy, so is military procurement of electronic equipment.

APPLIANCES—Production will be slightly lower than in 1951, about 65 per cent of the 1950 peak.

FARM MACHINERY—The same story holds here as that for appliances.

STEEL CONTAINERS—High activity in this field should characterize 1952.

MILITARY ORDNANCE—At least a 20 per cent increase over 1951 should occur in 1952.

IMPORTS AND EXPORTS—Higher "involuntary" exports may occur in 1952 because of our Atlantic Pact commitments. Metalworking imports may rise slightly.

UNITED
CLUTCH HEAD® SCREWS

When you look inside the Clutch Head design you will see why its popularity is growing so fast.

The deep straight-walled recess with the driving face parallel to the axis prevents driver ride-out. This requires less end pressure than with other recessed heads to set the screw in place, and prevents operator fatigue. Combined with the Type "A" bit, Clutch Head screws will give you complete satisfaction — and your field service men won't need a special tool; a common screw driver will do.

Ask for a descriptive brochure.

—when you think of fasteners think of United

SCREWS · NUTS · WASHERS
CLUTCH HEAD SCREWS
STAMPINGS

®Reg. U.S. Pat. Off.

United Screw and Bolt Corporation
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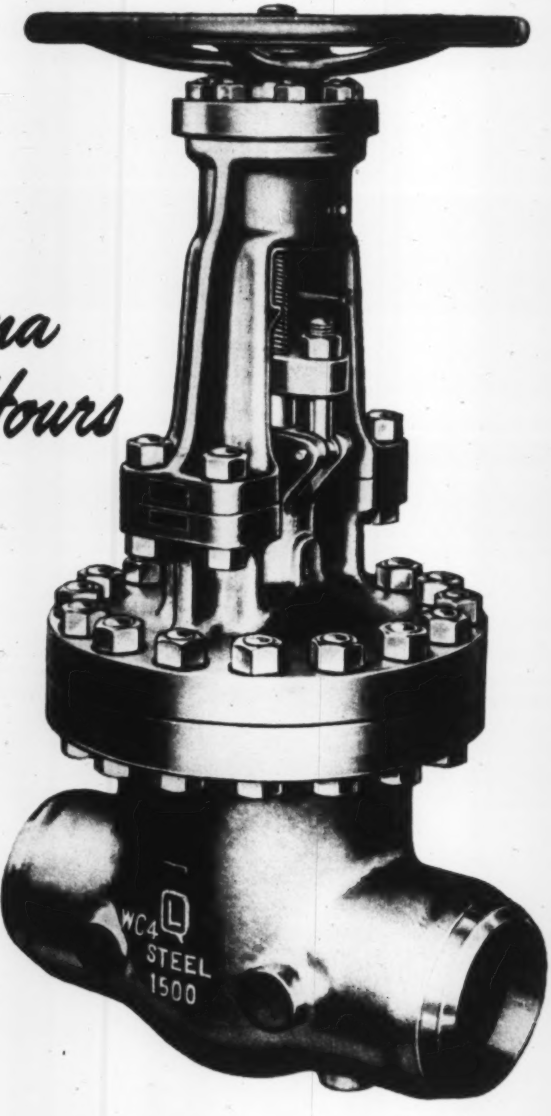
NICKEL-CHROMIUM MOLYBDENUM STEEL VALVE CASTING

Retains Stamina after 50,000 Hours at 900°F!



After exposure to steam at 900° F. for more than 6 years, a Lunkenheimer gate valve cast in nickel-chromium-molybdenum steel was made available for study through cooperation of The Detroit Edison Company.

Despite its long continuous service, examination of specimens taken at random, including sections of welds, revealed the following characteristics:

NO LOSS OF STRENGTH
NO EMBRITTLEMENT
NO OCCURRENCE OF GRAPHITE

This confirms extensive laboratory tests and provides convincing evidence that valves and fittings cast in nickel-chromium-molybdenum steel, conforming to requirements of grade WC-4, ASTM Specifications A-217, will adequately meet the severe conditions imposed by steam at high pressures and temperatures up to 900° F.

At present time, the bulk of the nickel produced is being diverted to defense. Through application to appropriate authorities, nickel is obtainable for the production of engineering alloy steels for many end uses in defense and defense supporting industries.

MANUFACTURED BY THE LUNKENHEIMER COMPANY, Cincinnati 14, Ohio, the valve selected for test was identical to the 4-in. gate valve shown above. Before removal for study, it served continuously for 53,810 hrs. at a nominal temperature of 900° F. and at an average pressure of 841 p.s.i.

INCO

THE INTERNATIONAL NICKEL COMPANY, INC. 67 WALL STREET
NEW YORK 5, N. Y.

AS THE EDITOR VIEWS THE NEWS STEEL

January 7, 1952

Incentives and Freedoms

Early dawn of 1952 witnesses confusion and distrust which make it easy to become discouraged about the future. For example, consider the manner in which competent observers view the outlook for the metalworking industry.

Those who know it best have unlimited faith in its potential. They are confident that under favorable circumstances it can make greater progress in the future than in the past. At the same time they are concerned as to whether this "favorable" environment will exist. They detect trends which if permitted to grow unchecked will lead to an intolerable climate for business. This would reduce the industry's potential.

These trends are apparent in current Washington thinking. The official vogue is to belittle the merit of economy and efficiency in government, to undertake gigantic commitments without checking whether they are needed or can be afforded, to persist in being unrealistic about taxes, to underrate the effects of inflation, to introduce precinct-level politics into cabinet-level decisions and to expand government power, controls, paternalism, subsidies and meddling without taking into account the degree to which such expansion deprives the people of their rights.

Costly experience has proved that mere protest against wrong policies is only partially effective. The negative approach never can be as powerful as the positive. At the present low ebb of administration prestige, the chances for success of a program of constructive action is excellent. This program could include pay-as-we-go financing, drastic reform of tax policy, re-evaluation of foreign aid, economy in spending, relegation of politics to its proper function, cutback of paternalism to sensible limits, abandonment of needless controls and other measures that will restore incentives and freedoms to their former potency.

These incentives and freedoms have been vital factors in the development of our nation. To re-establish them in full force is absolutely necessary if industry is to achieve its full potential.

The number one business in 1952 for everybody who has been deploring the way things have been going is to go all-out in constructive action to emancipate incentives and freedom. America needs them for inspiration.

E. L. Shaner

EDITOR-IN-CHIEF

HUMANS ARE PROBLEMS: Imagine that more than a hundred typical industrial executives were hooked in on an old-fashioned country telephone party line and that they were exchanging views on current problems. Imagine also that editors of this publication were privileged to "listen in" on their conversation. The result would be the consensus presented in this issue under the title "Steel Listens In."

The editors found that while industrialists are plagued by innumerable problems, most of them can be classified under four headings: 1. Weakening of incentives; 2. materials shortages; 3. management problems; and 4. difficulties with employees. Reducing the major headaches to four probably is over-simplification. However, it is significant that of the four, only one—No. 2—is physical and tangible. The other three deal directly or indirectly with frailties of human nature.

In the years ahead, the greatest opportunities for improvement of America's industrial system lie in a better understanding of the requirements and desires of the human animal. —p. 119

* * *

IMPRESSIVE FIGURES: A person desiring to grasp quickly an idea of the size and scope of the metalworking industry will do well to browse through the 48 pages of "Metalworking Facts and Figures" in this issue. He will be impressed with how marked has been the increase in sales of this No. 1 industry since prewar 1939, since war-peak 1944 or in comparison with any other milestone.

Particularly significant is the estimate of world production of steel ingots and castings and pig iron and ferroalloys in 1951. Ranking in steel production in order of tonnage are United States, Russia, Great Britain, Germany, France, Japan, Belgium, Canada, Czechoslovakia, Luxemburg, Poland, Italy and the Saar. Output in each of the other steelmaking countries was less than 2 million tons in 1951.

"Facts and Figures" covers statistically everything from raw materials through to the end products. In addition are data on labor, prices and earnings. —pp. 168-215

* * *

LIVING WITH CONTROLS: Since government controls on production covering the defense emergency were initiated in the latter part of 1950, authorities in Washington have issued seven Controlled Materials Plan regulations, nearly a hundred materials control orders and many amendments to them. The texts of these regulations, orders and amendments are voluminous and are cluttered with legalistic verbiage which puzzles most laymen. In order to make sense out of this mass of wordage one must not only translate it into understandable language but he must also determine what the present correct "score" is in light of the most recent amendments.

The editors have undertaken this formidable job. In 11 pages in this issue they present readable and understandable digests of production controls which tell you what they require and what they permit you to do in connection with your use of some 40 important materials. —pp. 127-137

* * *

BIG EVENTS IN 1952: In sizing up the outlook for 1952 from Washington's point of view, Washington Editor E. C. Kreutzberg answers the big underlying question of what Russia will do by saying that majority opinion in government circles is that the present "limited" emergency is not going to expand into all-out war this year.

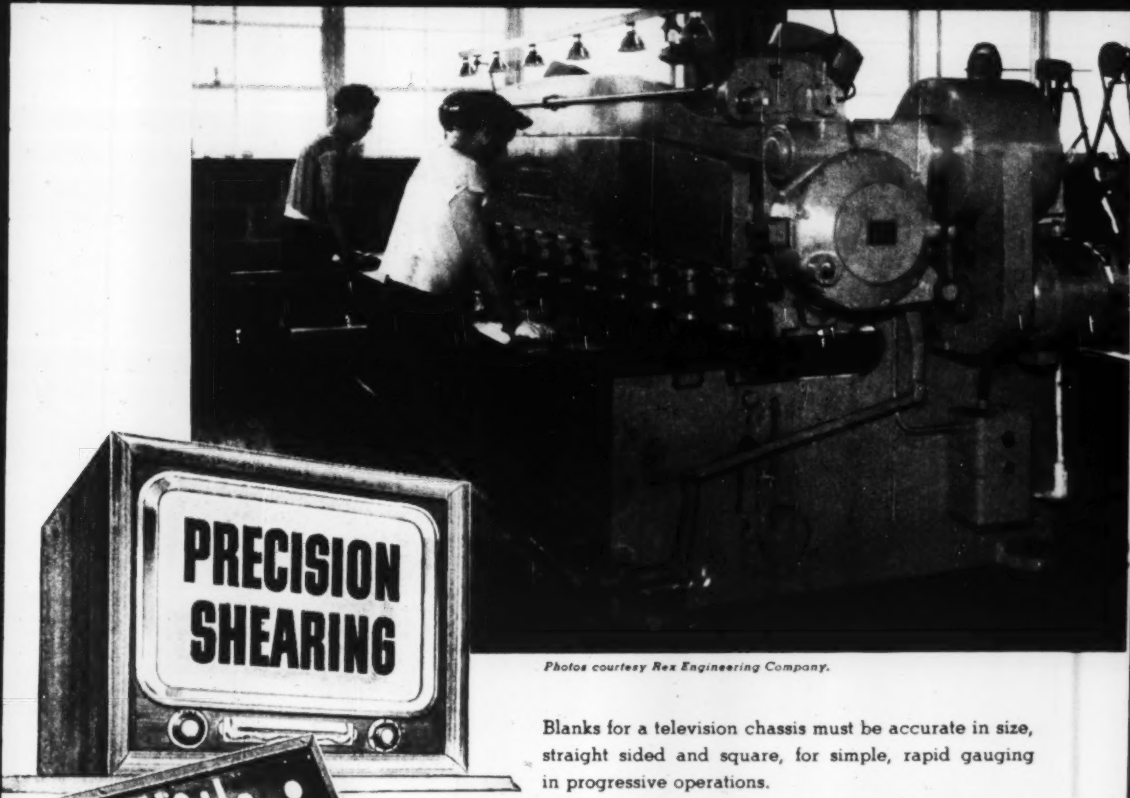
Assuming that this opinion proves to be correct, then the three big events to command public attention in 1952 will be the Presidential election, debate in Congress over the foreign assistance program for fiscal 1953 and debate in Congress over continuation of wage and price controls beyond their expiration date of June 30, 1952. All three have significance far beyond their dramatic possibilities because their outcome will have profound influence upon the route this nation will travel in the next few years. —p. 138

* * *

READY FOR TOMORROW: This publication's Engineering Forum has gained momentum and prestige during the decade or more of its presentation in its present form. This year the response from contributors has been exceptional in quantity and quality.

For convenience, the comments of experts on engineering progress have been classified under six general headings: Metal production, materials, processing methods, fastening and assembling, cleaning and finishing and manufacturing and engineering services. Readers of the 80-odd pages of comments on progress in these fields are bound to be impressed and inspired by the mountain of evidence which attests to the alertness and initiative of our technical specialists to meet the challenge of exacting demands upon technology.

As you read the appraisals of hundreds of specialists you will be cognizant of one important fact, which is that our technicians not only are successfully tackling the pressing problems of today but in some fields they are meeting some of tomorrow's problems with today's solutions. —p. 217



PRECISION SHEARING

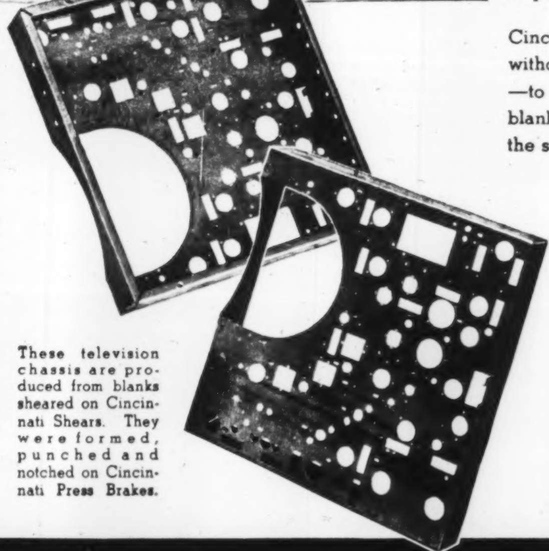
Photos courtesy Rex Engineering Company.

Blanks for a television chassis must be accurate in size, straight sided and square, for simple, rapid gauging in progressive operations.

Cincinnati Shears produce these and other blanks—without costly blanking dies—with speed and economy—to a plus or minus .005" tolerance. Various size blanks are sheared easily and quickly by changing the setting of the gauges.

Accurate blanks from Cincinnati Shears make forming, punching, and assembly operations easy and profitable.

Cincinnati Shears and Cincinnati Press Brakes are a team that brings quality of product with economy.



These television chassis are produced from blanks sheared on Cincinnati Shears. They were formed, punched and notched on Cincinnati Press Brakes.

Write for Catalog S-5, covering the full line of Cincinnati Shears—the shears of accuracy.

THE CINCINNATI SHAPER CO.

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SHAPERS · SHEARS · BRAKES

"That's it! I'll bet that's the answer to my coating problem"

"Ted Hubbard, what *are* you talking about?" asked his wife.

"That wax paper you're tearing . . . that may be the answer to the thing that's been giving the can manufacturers all the trouble."

Ted, an Inland mill representative, had been working for some time on a very peculiar problem in the plant of a large can maker and Inland tin plate customer. In lacquering tin plate for can ends, this customer's sheets had been coming through with "eye holes" (pin-head-size spots where lacquer failed to coat). Neither Ted, nor anyone else, had been able to learn *why*.

Ted, idly watching his wife tear wax paper from a roll, remembered: *Wrapping tin plate packages in wax paper was standard practice for many steel producers, and paraffin, a mineral oil derivative, would not mix with lacquer.*

Ted had a hunch.

Next day, the problem was solved! Ted proved that when the tin plate was removed from the wax paper wrapper, microscopic wax particles adhered to the edges of the sheets. During the lacquering process, these particles were drawn up from the edges and across the sheets by suction from the lifting device . . . were picked up by the roller-coaters . . . and wherever a particle lodged, lacquer failed to coat that spot on the sheet. This was the cause of the eye holes.

Tin plate producers switched to a different type of paper wrapping with the result: no more eye holes! INLAND STEEL COMPANY, 38 South Dearborn Street, Chicago 3, Illinois.

Names used are fictitious

Making Steel
Do Your Job Well
Is Inland's Job

Your Scrap is Needed by The Steel Industry for National Defense

STEEL
JANUARY 7, 1952

Metalworking's Destiny

What is Metalworking's Destiny? As another fateful year unfolds, it is a fitting time to pause and take stock—not so much in terms of the immediate problems of today but more within the broader concepts of tomorrow.

For, the world *is* changing. There is no road back to the yesterdays we sometimes fondly refer to as "normal."

This year the metalworking industry rounds out a dozen years of explosive growth and development. It has been a period of preparation for war, all-out war itself, a troubled readjustment to peace and now a buildup for what may be generations of armed peace.

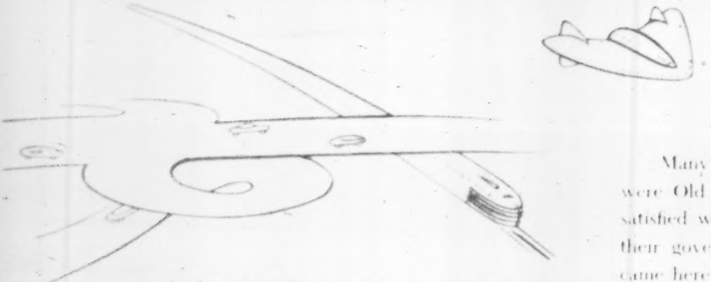
Metalworking sales have grown six-fold in the dozen years. Volume exceeds $100 billion a year and is still rising. Plant capacity has expanded far more rapidly than in any previous period. Except for local dislocations, we have full employment. Materials and manpower are the only limiting factors in the upward march of production and sales.

Yet in the face of this opulence, many of you in industry are profoundly troubled. You are discouraged over prospects for the future. You see the fruits of your efforts being dissipated for nonproductive purposes by a national administration which you distrust. You see incentives for producing disappearing. You fear that in the campaign against communism we will become the victims of the medicine rather than the disease.

You see our material resources dwindling. Until a few years ago, we were net exporters of copper, lead, zinc and aluminum. Now we must import them along with such vital materials as tin, columbium and manganese. We depend increasingly on foreign sources for iron ore. Rich America is becoming a have-not nation.

Each generation has believed that its problems were bigger, more important and more dangerous than those surmounted by past generations or perceivable for future generations. This generation is no exception.

Yet, in the grand perspective, there are good reasons for believing present-day problems



are of a historic and critical nature. Thoughtful men in industry are convinced that the next few years will be as fateful as this nation has faced or will face.

Even so, American resourcefulness and ingenuity can be counted on to surmount the problems of these fateful years and carry the nation to new heights of prosperity and world influence.

WE GLORY IN OUR PROGRESS

The metalworking industry has contributed substantially in raising the standard of living in this country to levels which other peoples find incredible. With less than 6 per cent of the world's land area and less than 7 per cent of its population, the United States has 70 per cent of the world's automobiles, 60 per cent of its telephones, half of its radios. It has 50 per cent of the world's steel production and about 40 per cent of its total manufacturing output. This wealth, all Americans share.

To this achievement, many factors contributed: A fertile country of continental proportions, a temperate climate, abundant and fairly well balanced mineral resources. Other nations with large land areas, rich resources and great populations have done relatively less with them.

What then is the reason for the towering development that has characterized this country?

The answer: Our productivity. It is our greatest national asset. It has enabled America to use its resources to achieve an unprecedented standard of living. It is America's real genius.

Why has American productivity been higher? Not alone because of our wonderful machines and gadgets. Not alone because of our assembly lines and mass production techniques.

Our productivity has been higher because we always have had more incentives to offer.

Many of the people who came to America were Old World malcontents. They were dissatisfied with the limitations and restrictions of their governments and their economies. They came here seeking larger opportunities.

Once here, they made those opportunities. They established a freedom from government dictation and exploitation which released the talents, the genius and thrift of the people and which provided maximum stimulus and opportunity for the individual.

Thus were laid the foundations for our productivity—the freedom to produce and to retain a substantial portion of that production. This No. 1 incentive has led America to produce more than three-quarters of the world's automobiles, has caused a five-fold increase in living standards in the last 100 years and enables every working man in this country to possess comforts and conveniences in his home that are the envy of the rest of the world.

IS INCENTIVE FADING?

And this incentive now is in danger. In the present emergency it is being sapped by taxes, by controls over wages, materials, prices and profits, by inflation and by paternalism of government.

Today, there is less incentive for people to produce, to save and to invest in business enterprises. Paternalism by the federal government protects and subsidizes the inefficient and improvident at the expense of the efficient and prudent. Inflation drains away the substance of that portion of our production we are permitted to retain.

Controls over wages, materials, prices and profits undermine initiative of the individual and of business management. So many decisions on how much we can produce, what we can make, the price we can charge, the profit we can keep and the wages we can earn are made in Washington that little is left to the producer and the worker.

But the greatest threat to our incentive is progressively higher taxation which could envelop and strangle the very system we are spending so many billions to defend.

More federal taxes were collected during the past six postwar years ($262.6 billion) than in all the 156 previous years of the republic ($254.2 billion) including the Roosevelt administration and World War II.

Today, federal levies alone may take two out of every three dollars earned by a business enterprise. One large metalworking company figures its tax load, which was 50 per cent during World War II, will be 68 per cent in 1952. Taxes take four dollars for every dollar paid in dividends.

For business enterprise, the present tax structure lessens the demand for rigid control over expenditures. When expenses cost only 30 cents to the dollar, management is less likely to demand a dollar's worth of value in return.

If present corporate taxes continue, modernization and expansion of productive capacities will become more difficult. There will be less incentive to risk available funds as venture capital.

Small and new business will be discouraged, thus fostering monopoly and limitation of opportunity.

For individuals, the tax load also is strangling incentive. A Brookings Institution survey indicates that 95 per cent of the men queried believe high taxes are adversely affecting incentives to work, to save and to invest.

There is a tendency to "take it easy" after incomes reach certain levels. A manufacturer's agent on a plane to Florida early in November explained: "If I continue to work during the last two months of the year, the government will take half of what I earn in taxes. It just isn't worth the worry and strain."

In Great Britain, where income taxes are higher than in this country, even charwomen are refusing extra work because too much of the added compensation would go for taxes. In thousands of U. S. metalworking plants, managers blame taxes for absenteeism and for the reluctance of men to work overtime.

WHAT MUST BE DONE?

Since the threat to incentive arises largely from federal government policies the obvious and easiest answer is to damn the administration. While this may provide mild relief from the feeling of frustration that grips most of our people, it does nothing to remove or contain the threats.

Even a change in the administration is not the whole answer, although it may be a necessary component.

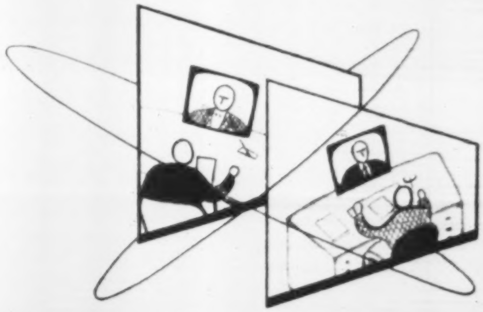
What is necessary is a re-examination, a re-evaluation and a redirection of our whole concept of politico-economic philosophy.

The goal should be the re-establishment of incentive, which has been so much a part of our national progress.

It is suggested that first we need a searching inventory of our whole economic position, including taxes and expenditures, debt, controls, prices, profits, materials, capacities, and of our domestic and global positions.

From the results of this inventory, in which top-flight industry men would participate, it would be possible to lay down a course of action permitting maximum functioning of incentive. We would learn how much our economy can stand.

The approach to such a study must be realistic and positive. On many measures there can be no turning back. In the complex system which we have evolved, some government controls are necessary and desirable. We must ac-



cept the reality of a huge national debt and the inescapable fact that our obligations permit no depressions. Nor any wholesale deflation.

America's international leadership has become an obligation we cannot shirk. We must formulate sensible foreign policies and insist they be administered with fairness and consistency.

Here at home we cannot overlook the necessity for a large measure of social security (in providing for the aged, the disabled, the sick and the destitute, the question is not if, but how), protection of minorities and such developments as the growth in influence of labor.

Once a course of action is determined, industry must give it vigorous support. The objectives must be explained to all the people with sincerity and persuasiveness. This will require more than financial support, more than membership on committees or groups backing the program. It will require your personal effort. It will require a selling job to professional people and to the children and youth in schools. It will require you in industry make government your business.

A PROGRAM FOR ACTION

Some of the steps that must be taken for restoration of incentive already are well known to you in metalworking. Many are expressed in this issue of STEEL. Steps recommended include:

We must make a more determined effort to eliminate or minimize non-essential expenditures in both civilian and military establishments.

We must re-evaluate our international and foreign aid policies, which since 1940 have drained away $75 billion (net) of our resources.

We must strive for a reduction in planned expenditures, which threaten continuing inflation and waste of resources.

We must adopt a pay-as-we-go policy in the present emergency.

We must review tax policies to halt the extreme progression in the present system.

We must minimize politics in the formulation of controls over industry.

In industry, we must redouble efforts to develop new cost-reducing innovations and better techniques to raise the output per unit of human effort and per dollar investment.

WHAT IS OUR DESTINY?

Should a co-ordinated and constructive program of action be made a fact—and it can be made a fact if we make it our business—America's future will be great. As a nation we will worry less about the dangers from without.

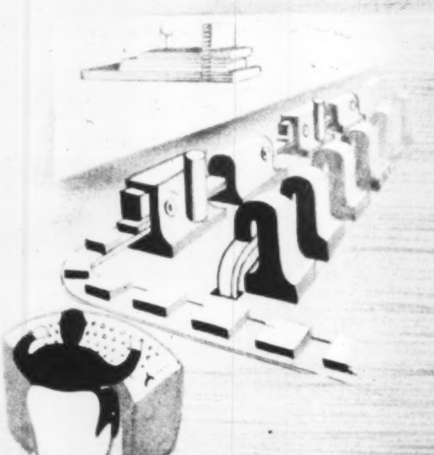
Metalworking industry will double and redouble its productivity. It will contribute to the doubling and redoubling of our standard of living.

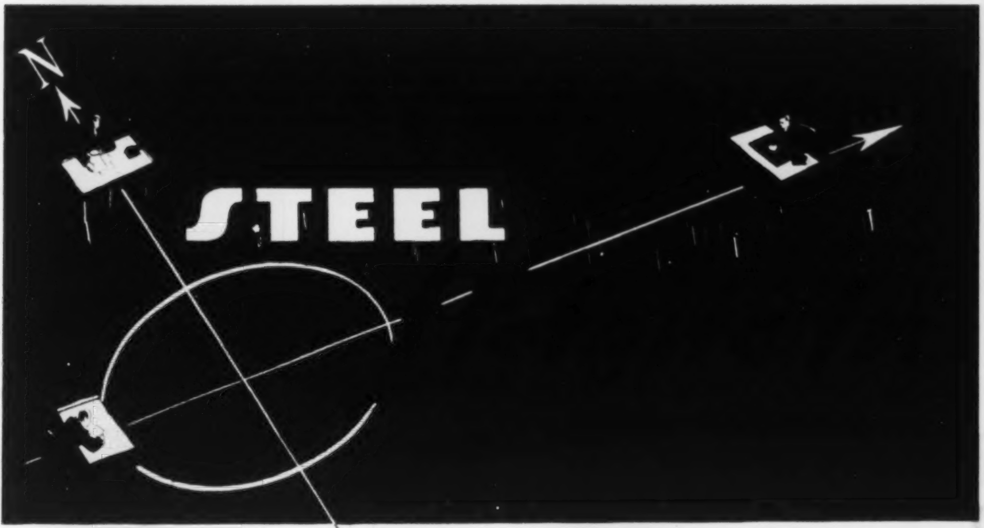
We will solve the problems of dwindling resources through exploration to develop new sources for materials, development of alternate materials, discovery of new materials and better utilization of the materials we now have.

We will harness the new forms of energy to make them do our will in turning out productive goods.

We will achieve security through productivity.

Then we as a nation and as an industry can feel confidence and exhilaration in our strength, and once again become conscious of the splendor of our destiny.





THE OLD PARTY telephone line is disappearing. The equipment replacing it is vastly better mechanically. But in the passing of the old party line we have lost a medium of communication that kept entire communities informed on common problems, what others thought about those problems, and what was proposed as solutions.

STEEL here revives the old party line idea—with modifications. The editors traveled to all parts of the country, sat down with more than a hundred metalworking executives, plus management consultants, accountants and bankers closely connected with the industry. They asked about the problems management is encountering and about corrective measures that should be taken. The editors sought, and obtained, the answers at the industrial "grass roots" level.

Problems They Found—In the midst of high production, full employment, record sales, and an expanding industry, plenty of weighty problems were found. Four of these appear to be basic and major: 1. Weakening of incentive; 2. materials shortages; 3. technical management problems; and 4. difficulties with labor. There are many other problems, but in perspective most of them emerge as corollaries to the four basic problems or as tangent to them.

In these conversations, there developed an astonishing agreement on what the fundamental problems are. Chief disagreement lies in the order of seriousness of the secondary problems. Surprising agreement also exists on the steps we must take to arrive at solutions to our basic difficulties.

Listen In—Now ringing is your telephone on the party line. Pick up the receiver and listen.

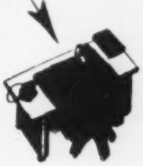
Incentives Undermined

"High corporate taxes, if continued for a period of years, will reduce industry to government domination," says Col. Willard F. Rockwell, board chairman of Rockwell Mfg. Co., Pittsburgh, and wartime head of the Maritime program. He reflects the opinion of practically every man interviewed that the limit on corporate taxation has just about arrived. Unless reversed, the progressive tax load on corporations will stifle initiative and slow the rate of industrial growth, admonishes C. E. Jarchow, vice president and comptroller, International Harvester Co., Chicago. He points out that the tax load on companies is widely misunderstood.

Higher than in World War II—During World War II, normal tax was 40 per cent and excess profits tax reached a high of 45.5 per cent. In 1951, the rates were 47 and 30 and for 1952 will be 52 and 30. On the face of it, the total tax load would appear to be 85.5 per cent during World War II, 77 per cent in 1951 and 82 per cent in 1952. That's not true. Because of the higher normal tax now and the changed base on which excess profits taxes are figured, International Harvester's tax load in 1952 will be an anticipated 68 per cent of profit, against 65 per cent in 1951, 50 per cent in World War II.

Col. Robert C. Downie, president of Peoples First National Bank & Trust Co., Pittsburgh, and during World War II chief of the Pittsburgh Ordnance District, believes that if the present administration continues another term following the 1952 election, the taxes on American industry will be "much increased" beginning in 1953 and thereafter. "Even if the Republicans take over in 1953, the tax load will be enormous, but I expect we could look for a sounder fiscal management and gradually a sounder economy."

Profits After Taxes To Drop—Operating profits of industry will likely be higher in 1952, but the increase will not be sufficient to make up for the additional taxes being imposed. Such is the view of Allen Vogeler of the Cincinnati law firm of Taft, Stettinious and Hollister. "High tax rates force corporations into borrowing because they don't have available sufficient cash for replacements and operations," he adds. The spokesman for a large steel producer points out that a corpora-



tion today must "earn three dollars to retain one to be used for dividends and plant expansion and modernization."

Hamper Scrap Drive High taxes have even had a peculiar effect on scrap drives. Some plant executives, charges Don Barbour, Seattle scrap dealer with Bar-Rob Inc., refuse to dispose of obsolete machinery because profits from such sales would be largely confiscated by taxes. This attitude is common in the Southwestern oil country.

Virtually all the men interviewed agree that the first way in which taxes stifle incentive is by limiting business expansion. A vice president of a Detroit machine tool company puts it this way: "All our expansion has to be paid for out of earnings and we're not being allowed to keep enough to expand the way we need to. The excess profits tax is particularly hard on machine tool builders. None has a good base period." High taxes can "render industry stagnant by taking away working capital," says M. L. Ruggieri, vice president and general manager of Line Material Co. in Birmingham.

Tower of Babel Complications in paper work is a problem pointed out by E. G. Beamer, Cleveland resident partner of Haskins & Sells: "A Tower of Babel exists in the reporting of financial information." Today a company may be required to report its operations, he says, in the different tongues of the Internal Revenue Bureau, Securities & Exchange Commission, Office of Price Stabilization, Federal Trade Commission, Interstate Commerce Commission, Renegotiation Board and frequently several state agencies.

The growing complications, he says, of taxes and government controls, plus the variances in reporting requirements result in a terrific drain on management's time and money. Accounting costs today of the average company are at least triple what they were in 1939 two or three months a year of most of the top accounting talents' time must be devoted completely to government business.

Controls Undermine Incentive — Consensus of the men on the party line is that government controls are still another serious threat to our economic incentives. The majority shares the opinion of William M. Cowles, vice president-sales, for Superior Steel Corp., Carnegie, Pa., who says, "I am quite sure the present control program is being administered honestly. In any situation short of all-out war, any controls program is hard to justify and even harder to direct and enforce." Most also share the views of International Harvester's Mr. Jarchow that "to remove controls now would be a mistake, but one speculates that maybe we could have gotten along without them in the first place."

WILLIAM M. COWLES

". . . Modern methods, increased efficiency answer to rising cost factor"

"The principle of materials controls is O.K.; it's the execution that's bad at times," says one of the few people who had anything good to say about the Controlled Materials Plan, H. L. Conlisk, supervisor, application engineering, Pacific Gear & Tool Works, San Francisco. "But," he points out, "CMP shows the lack of preplanning." He believes distribution controls are necessary in times when demand exceeds the producers' ability to produce. He foresees the possibility of controls continuing for two to five more years.

Unworkable in Peacetime — Another San Franciscan, Cloyd Gray, president of W. R. Ames Co., holds an opposite view. He thinks the fundamental philosophy of CMP is "totally wrong." He adds: "Controls just won't work in the present dual economy. They would be O.K. in wartime." He points out that controls naturally help large firms, and the small companies are being looked after with particular care, but the medium-sized firm like Ames is forgotten. Like the middle class, he fears that the middle company will falter in a controlled economy.

The most crying inequity in present government controls, according to Dr. Alfred P. Haake, economist, Park Ridge, Ill., is the lack of understanding of industry by those who are exercising the controls.

Look at Canada — Col. Rockwell points out that Canada's experience with a minimum of controls demonstrates that curbs as severe as these in the U. S. aren't necessary. "If the United States' controlled economy is allowed to continue under the disguise of national emergency, it will eventually drive small business completely out of the picture," says Paul W. Newcomb, president of Precision Drawn Steel Co., Camden, N. J. Col. Rockwell paints the picture even darker than that. He predicts: "A regimen of three or four years of controls will enable politicians to dominate and destroy efficient business operation."

Is War Menace Magnified? — About one-third of the men on the party line think the administration is magnifying the Communist menace for political purposes. Another third believe Russia is as serious a menace as we have ever faced but that the administration is using the situation to the limit for political purposes. The final third believe the threat of all-out war from the Communists is as serious as the Trumanites say and that they are not trying to make political capital of the danger.

Philip M. McKenna, president of Kennametal Inc., Latrobe, Pa., cites the book *Planning in Practice* by Ely Devons, Cambridge Press, Cambridge, England. "It exposes human reactions under controlled allocations in the British aircraft industry as much more costly than free markets where the penalties for overestimating requirements are costly only to the firm making errors."

How Much Inflation? Inflation is yet another most serious threat to our economic incentives, the metalworking men believe. As Mr. Cowles of Superior Steel puts it, "Increased costs can best be offset by increased efficiency and productivity, but there's a limit to what can be expected along those lines."

Charles Smith Jr. president of Steel Improvement & Forge Co., Cleveland, points out that "the present inflation has boosted our replacement costs to more than double the price we originally paid for our equipment. Our 12,000-pound steam hammer cost installed $35,000 in 1940. Today total installed cost would be $87,200."

Dollar Fades Fast — Inflation complicates the already complicated question of depreciation, says Frederick S. Blackall Jr., president of Taft-Pierce Mfg. Co., Woonsocket, R. I., and also of the National Machine Tool Builders Association. As long as inflation exists he favors "spending the depreciation allowances within the year in which the depreciation has accrued."

The dominant and controlling factor in rising costs and inflation is the increase in wages, according to H. H. Tullis, vice president-finance, Armco Steel Corp., Middletown, O. "Controls are not helping," he says. "I believe they contribute to more inflation." International Harvester's Mr. Jarchow takes a slightly different view. By encouraging the unions, by deficit spending, "the government is responsible for inflation," he says. The Chicago man foresees little price relief and higher costs coming up. "The Capehart amendment in practice does not do all it was intended to do theoretically" in granting price relief.

"Costs are going to rise as long as the fiscal policies of the government continue as they are," says E. A. Mattison, vice president of Bank of America, San Francisco.

Materials Short

Second to the threat to incentive, metalworking men say the shortage of materials ranks as their most troublesome problem. It ranks second largely because industry is better equipped to deal with it than with the more intangible threats to incentives. Throughout the conversations on controls there is less groping for definitions, more specific complaints.

Is CMP Necessary? Ephraim N. Osterberg, director of purchases for Stewart-Warner Corp., Chicago, questions whether "CMP is going to be a necessity after the second quarter." Thus far, he says, his company has received fair treatment in allocations, but the real problem is to get mills to accept the allotments after the buyer gets them. In the fourth quarter, a big company like Stewart - Warner could get only about 75 per cent of its tickets cashed by the mills. It had to scratch for the rest with warehouses and other supply sources.

C. E. JARCHOW

". . . Government is responsible for inflation . . . lowering living standard"

Rockwell Mfg. is not making out well under CMP, and Colonel Rockwell "would fire the theorists to improve the operations of the plan." Ironically, his company is doing "reasonably well in materials and components not under CMP."

Mr. Cowles of Superior Steel says his company is "doing as well as can be expected under CMP." He points out that no materials allocations can work too well in a dual economy.

Cashes Third of Tickets — Fred Hoffman, president of Hydraulic Supply Mfg. Co., Seattle, says he can obtain no more than 30 or 35 per cent of his authorized allocations. Another Seattle firm, Dulien Steel Products Inc., is particularly alarmed about scrap which is trickling into its yards "on a hand-to-mouth basis." The company president, Louis Dulien, believes NPA is "doing a reasonably good job." A Seattle scrap dealer, Don Barbour of Bar-Rob Inc., thinks scrap should be sold locally. He cites the case of a well-heeled out-of-state buyer who outbid all the local users for Navy material, paid the high price plus the cost of shipping from Seattle to Texas.

L. W. Stettner, president of Victor Equipment Co., San Francisco, believes "essential industries are starved for critical materials, possibly by diversion to uses not necessarily in the defense picture." Another company in the city, Schlage Lock Co., "is not getting enough materials by a long shot." Compared with the last three quarters of 1951, first quarter materials allotments have been cut 24 per cent in copper mill products, 34 per cent in copper foundry products and 2 per cent in steel.

Hoarding — Alvin Klein, president of United Specialties Co., Birmingham, believes that "overallocations in some quarters are building larger-than-needed inventories at the expense of the less fortunate." His company is making out "excellently" in materials and components not under CMP.

Two Boston companies—James Russell Engr. Works Inc. and Massachusetts Engr. Co. Inc.—are buying foreign steel to augment supplies, and they're typical of many seaboard companies who have resorted to the practice even though the material is premium priced.

Less Business—Two screw companies—American Screw Co., Willimantic, Conn., and Waltham Screw Co., Waltham, Mass.—are typical of many types of firms who are having fewer materials troubles than a quarter or so ago, not because more metallics are available but because less business is available. They, like John L. Clemmey Co., Mansfield, Mass., fuel oil tank fabricator, and many other firms are looking for more defense work to be eligible for more materials.

The situation with machine tool manufacturers, such as Brown &

Sharpe Mfg. Co., Providence, R. I., is just the opposite. "We anticipate even greater output for 1952," says Paul R. Hatch, the company's vice president. "The flow of raw materials and component parts is stable, and that factor of manufacture should improve, with government assistance."

Wanted: More Scrap "The materials shortage is the most serious problem plaguing small business," says Ralph R. West, president of West Steel Casting Co., Cleveland, and of Smaller Business of America Inc., an organization of executives in smaller companies.

Scrap is causing the greatest difficulty for Mr. West. His company now has only four days' supply, but normally operates on a 21-day cycle. "If there's the slightest dislocation of transportation, we'll have to close down."

Management Headaches

A dual economy's dislocations cause many management problems, which are thought the third basic question. One management problem is the difficult matter of scheduling in these days of shortages, as brought up by Mr. West. He's also concerned with the question, especially serious for small business, of subcontracting. Small companies are still dependent upon volume contracts for profits. For the most part, they aren't getting them through the subcontracts by which most win their defense business. At West Steel Casting runs of five or six months are the best the company can get. A danger also exists: To win the volume contracts, many small firms bid too low for the job. Mr. West wants better breakdowns on the dollars awarded in prime contracts. Many of those figures now include sums for long-range development, new plants for the prime contractor, but they're all lumped together and a potential subcontractor can't get much of an idea of the possibilities for him when the total dollar amount is all that's listed.

Not all Are Busy—More than one executive has the managerial problem of Samuel Soss, president of Soss Mfg. Co., Detroit. His difficulty can be summed up in three words: Not enough business. He says that it's difficult to get ordnance work from any district ordnance office except your own. That worked out well in World II when all districts had plenty of contracts to let, but now it's rough.

Diversification of business is another managerial problem, points out George C. Sargeant, president of Sargeant & Wilbur Inc., Pawtucket, R. I. The company makes electrical industrial furnaces and also has a heat-treating division. It has managed good diversification thus far, but it takes some doing in these mixed up times.

Absentee Control — A Detroit manufacturer thinks controls are a necessary evil, but that they would be more bearable if they allowed management a little more leeway for decisions. "They in Washington have taken all the responsibilities away from business," he points out. He and nearly all the men on the party line charge that it's physically impossible for management to comply with all the terms of all the regulations now pouring out of the nation's capitol.

As an indication of how controls tighten management's perspective and freedom, an eastern fabricating company reports that before the latest controls, it normally operated on a profit margin of 12 to 15 per cent. Now that has been reduced to 8 to 10 per cent. Such a profit for that kind of company means that its management must skate for the duration on thin ice.

JOHN C. VIRDEN

"... . Time has come for an inventory of just where we currently stand"

No Shortage of Problems—The diversity of managerial problems is itself a problem. One week a president may be wrestling with the matter of an engineers' shortage, the next with a lack of suitable housing for the engineers he has managed to hire. That sort of thing is before many a company executive, including George Lamb, president of Lamb Foundry Co. Inc., Hoquiam, Wash. That the shortage of engineers is particularly acute in the Pacific Northwest is attested to by Howard R. Dishman, manager of the Employment Security Department's Seattle office, L. H. Bates, Washington state employment security commissioner and Glenn E. Brockway, manpower administrator for the Northwest.

Still another management problem is: Just where does management end and labor, bookkeeping or publicity release writing begin. Hugh W. Wright, director of public relations for Armco Steel Corp., believes, along with Brooks Darlington, a San Franciscan, and most others on the party line, that public relations is definitely a management function. Many companies operate as though that were not the case, and all too frequently those firms' public relations are poor or mediocre.

Management Too Thin—A final management problem worrying many men is the shortage of management men. World War II disrupted the normal training process and now we have a shortage "at the colonel, major, captain and lieutenant levels." Under the present tax setup many good men aren't well enough paid. But one effective means left of boosting management's remuneration is a profit-sharing program.

Difficulties with Labor

The fourth most serious basic problem is labor—how to get workers, how to train them, how to keep them, how to deal with them.

The majority of executives today are in the predicament of W. K. Stamets, president of W. K. Stamets Co., Pittsburgh. They don't have enough labor, especially skilled. The best answer appears to be to recruit the unskilled, then train them. All companies are following the established recruiting methods today for skilled labor—with poor to mediocre luck. Van H. Viot, industrial relations manager for Koppers Co. Inc., Pittsburgh, says its recruiting drives have met with "some success."

Training programs frequently come up against the stone walls of wage controls which often stipulate such relatively low pay for trainees that few or none will sign up. What's more, some of the workers who normally would help train new men won't do it unless Wage Stabilization Board comes through with raises for them. George White, national president, Mechanics Educational Society of America, Detroit, candidly admits that many tool and die makers (where the skilled shortage is most severe) won't help train a lot of new men and "dilute" their own jobs unless they get enough pay to make them willing to take the risk.

Productivity — Up or Down? — Productivity under today's conditions might be expected to fall, but Messrs. Viot, Stamets and others report that productivity is up. Superior Steel's Mr. Cowles is one who thinks productivity is not increasing enough. He says, "Studies are being made to improve the efficiency of individuals through improved equipment, reduction in handling, better incentive plans, more supervision and improved flow of materials."

Wages Force Inflation — Most men on the party line agree with Guy E. Reed, president of the Chicago Association of Commerce & Industry, and executive vice president of Harris Trust & Savings Bank, that stability "is precluded by the insistent demand of labor for higher wages."

A few make the point that productivity drops when a union takes over a shop. That's the opinion of Glenn Way, president, Hughes-Keenan Corp., Delaware, O., a community now being plagued by union organization drives. "We are finding that national labor laws still are too lop-sided in favor of the unions. Our people don't want to be unionized. They know they're better off under present conditions. They have a profit-sharing plan that beats any union pension plan in every way. Their wages are not limited to a horizontal scale level. They have more incentive to work."

M. L. RUGGIERI

". . . Talk to your neighbor and explain his stake in a sound economy"

Labor Relations Better—With so much of management feeling the way it does about wages, many executives have a tough time in keeping their tempers these days in dealing with labor leaders during wage negotiations. Nevertheless, management's relations with labor have improved, "have reached a sophisticated stage," says John B. Richards, a negotiator representing California Metal Trades Association which has a membership of 300 firms. Most executives in smaller companies agree that the management association is the best through which their firms can deal with labor on the formal negotiations level.

In dealing with labor on matters other than wages, management has been doing well, of late. It has even acquitted itself creditably in relations with leftist unions, although many management men, including Mr. Cowles and Colonel Rockwell, think a federal law should be passed making it unnecessary for management to deal with Communist unions.

Forgotten in White Collar—Under the heading of labor, most metalworking men think, should come the matter of the white collar worker, called the "forgotten man," by Robert T. Harris, president of Southeastern Metals Co., Birmingham. Koppers' Van Viot says the Salary Stabilization Board should rectify that situation.

Toward a Solution

A lot of conditions need rectifying, and about half the time on the party line was devoted to constructive suggestions. Here's one proposed step to meet the incentive, materials, management and labor problems:

"The time has come for an inventory of just where we are in regard to prices, taxes, raw materials and other economic matters. President Truman should establish at once a commission of high-caliber men to make such a study. From those findings we can better determine our future course in global affairs and that route in turn can dictate the need and extent of U. S. controls on industry."

So says the Cleveland industrialist, John C. Virden. He's board chairman of John C. Virden Co., manufacturer of lighting fixtures, vice chairman of the Federal Reserve Bank of Cleveland, member of the executive committees for Eaton Mfg. Co. and Interlake Iron Corp. and a director of Cleveland Electric Illuminating Co. In addition, Mr. Virden in 1948 headed the government's voluntary allocations program and now is a member of the Business Advisory Council of the Department of Commerce.

Can't Mend All Fences — Mr. Virden agrees with Secretary of Commerce Charles Sawyer, whom he describes as a man gifted with "business statesmanship," that we need a sound domestic economy above all else. "If we try to mend fences all over the world and by so doing neglect our home front," Mr. Virden points out, "we are not helping the world.

"Inflation," he believes, "is one of our greatest problems today." Controls can never completely check inflation. Because of inflation here, Russia may gain many of her objectives without a full-scale war. We should then re-examine our world position to decide how far we should go on any global adventures that may so weaken us internally, probably through inflation, that the Communists can gain their ends by our default.

A top-level inventory is especially needed for materials because "we're working ourselves into a strait-jacket there." His proposed inventory would seek to forestall the spread of controls. In his judgment the wartime curbs were relinquished reluctantly and if industry is "locked in" again it may be forever.

New Goals The inventory may also serve the purpose of giving us new goals, new aims for high-minded leadership for which the world is now crying.

The idea of inventory is probably the most basic solution suggested by anyone on the party line.

It's aimed right at the four major problems. A top-level inventory can point up the scarcity of manpower in the higher echelons of management and by giving new goals may shake management out of its innate conservatism.

Plunder and Blunder It may also shake government out of its habit of "plunder at home and blunder abroad." Almost to a man, the people on the party line point out that an inventory of government operations has already been made, by the Hoover Commission, but not fully implemented. All want greater economies in government and say that the Hoover Commission and Senator Byrd (Dem., Va.) have proved that it can be done. Most agree with Emil Gairing, president of Gairing Tool Co., Center Line, Mich., "that if industry were run like the government we'd all be broke."

Mr. Gairing says we must do something about the tax load, controls and labor problems. "I've meant it," he adds, "when I've said I'd close down rather than submit to some demands which have been made."

Top to Bottom That's why he and many others on the party line recommend that the technique of inventory be carried from the top to bottom. A company periodically must take an inventory of its position not just its stocks of materials and orders on hand, but its relations with the community and employees, its position as to junior executives who may eventually run the company, its long-range competitive position.

Communications Weak Most of the men on the party line admit that an honest appraisal reveals that industry's methods of communication with the public and employees leave "much to be desired. The solution, in the opinion of Steel Improvement & Forge's president, Charles Smith, is improved communication down at the local level not through the National Association of Manufacturers or national or state chambers of commerce. A part of management's responsibility, Mr. Smith thinks, is to participate in local community activity. Too many business men are "too busy" to talk at the neighborhood church, school and similar affairs, he points out, "but the average union local will send a speaker anywhere."

Marxism in Youth Mr. Smith was shocked at the results of a recent Opinion Research Corp. survey that showed that more than 60 per cent of high school students believe in the Marxian way of life. "Those high schools may be providing your future labor," he says. His company has experimented with optional, informal economic courses for its employees. He believes that education and communication not laws on the federal books are the real means of getting along with labor.

For that reason he opposes any statute that would make it unnecessary for a company to deal with left-wing unions. "You can't legislate Communism out of the country," he believes.

Tell Industry's Story As part of its employee communications and good neighbor policies, Steel Improvement recently held an open house. At that affair it had signs made for every major piece of equipment in the plant. Those signs showed the cost of the machinery, the cost of replacement, the number of jobs the device created and the per capita investment needed to create each new job.

Line Material Co.'s M. L. Ruggieri says, "In our place we are having lecture courses and education films and down-to-earth discussions." He thinks industry should help get public sentiment aroused to present basic dangers, so, particularly, "it can halt greatly increased taxation."

CHARLES SMITH JR.

". . . Good communications—not laws—best basis to get along with labor"

Weatherhead's James M. Baker is concerned, too, about industry's communications problems, but partly counterbalancing his alarm about inflation is his belief that, "American people and industry have shown an astonishing capacity to absorb higher taxes and wages."

Look at Your House Organ Problems of inflation and materials, Mr. Baker thinks, must be revealed to employees and the public. One of the best information mediums, although it's generally neglected, is the employee house organ. "I'm tired of those blurred pictures of fish and babies that fill the space in so many company publications," he says. "In my opinion, a management-viewpoint column or editorial has a legitimate place in the house organ. The news in those publications should be unslanted, but better written than much of it is today." Labor, he believes, is doing a better job in communications than is industry, although labor has the advantage of sympathetic government legislation on many aspects of the matter.

Voice of Government Loud — But management doesn't compete with labor alone to get its ideas across to the people. It also competes with government. Haskins & Sells' E. G. Beamer is concerned about the flood of government publicity releases, speeches and interviews which play such an important part in molding public opinion. He and others on the party line agree that industry can't hope to come up with the volume of communications the government can, but its challenge is to make its communications better than the government's.

Athel F. Denham, president of the public relations and advertising firm, Denham & Co., Detroit, says industry's public relations could be improved if business men learn to distinguish between publicity and public relations. "Publicity," he says, "is only one phase of public relations."

Starts at Top—The PR man, in Mr. Denham's opinion, must either have a hand in shaping company policy or be able to work directly with those who do have the policy-making responsibilty. Industry's communications could be improved if they were faster, he believes, particularly in labor matters.

Improving — John G. Mapes, president of Group Attitudes Development Corp., public relations counsel in New York, says, "Today, the public attitude toward industry is on the whole favorable. Most employees of industry regard their employers at least as favorably as they do the heads of the unions they belong to." Industry can make its public relations still better, Mr. Mapes believes, by developing even more "sincerity of purpose, genuine good will and moral as well as economic integrity."

Clint Milstead, director of public relations for Associated Industries of Alabama, agrees with Mr. Mapes that industry's public relations are as effective as labor's.

M. K. Mellott of the Pittsburgh public relations firm, M. K. Mellott & Co., says a company-level inventory will reveal that industry's communications have made great improvements in recent years. He believes that trying to measure industry's PR job against labor's is like trying to measure apples in relation to potatoes. Labor has the easier PR job. It has been allowed to assume the role of critic. Management has been required to assume the more difficult role of responsibility between industry and every segment of the public.

Mr. Mellott believes that in its campaign to improve general communications industry is making progress in the right direction after some false starts and overreaching.

Common Objectives—Practically all the people on the party line who are interested in the problem of industry communications point out that one aim of industry's public relations is to show that "what's good for industry is good for employees and the country." Good communications should strive to show that management and labor have many common objectives—full employment, continuity of employment, better working conditions, greater production. Good PR can lessen the danger of strikes, improve productivity, oil the wheels that make industry go around.

Quit Talking To Ourselves — Here, according to Robert Newcomb of Newcomb & Sammons, industrial relations counselors, Chicago, are some of the PR lessons to which 1951 gave new emphasis. They should be pasted in management's hat for 1952:

1. Industrial management should stop talking to itself exclusively at management gatherings. The audience is in agreement, and was in agreement before it arrived.

2. You can't lessen or destroy the old-time personal relationship of employer and employee, as a result of industrial expansion, and offer no substitute for it. The best substitute is good day-to-day, man-to-man contact between boss and employee, from top to bottom back to the top, through trained, competent and understanding supervision.

3. You can complement and support good personal communication by good written or printed communication—the employee publication, the management newsletter, the plant bulletin board, audio-visual aids, the open house, the plant tour, the group meeting, the annual report etc.

4. Remember, also, public acclaim of your good deeds cannot take the place of the good deed itself. The best public relations man in the world needs more behind him than a budget.

Good Job—A public relations job that stands out in the minds of most men in the profession is that done by Monsanto Chemical Co. during the Texas City, Tex., fire, reports William A. Durbin, director of public relations for Burroughs Adding Machine Co., Detroit. Monsanto provided the help it could to the community at the time; it gave complete help to the press to cover the disaster; and finally it helped restore the damage done the city. In Mr. Durbin's opinion the company is more highly thought of now than before.

EMIL GAIRING

". . . If industry were run like the government, we'd all be broke"

In the general problem of communications, the special problem of industry's relations with government looms larger and larger.

The Objective View—"Roll with the punches on government controls." So advise Robert Heller and F. L. Elmendorf of Robert Heller & Associates of Cleveland. These men are in a unique position to view objectively the relations between government and industry because they work in both fields. Their firm has as its clients a substantial number of the "blue chip" corporations of the country, as well as the Post Office Department and the Department of Defense. Mr. Heller is credited with having written the first practical program for the reorganization of Congress, which he contributed to the country.

The Cleveland firm of management consultants had a mammoth job, starting after World War II and recently completed, of assisting the secretary of Defense in his unification of the armed services. Further, it worked for the Hoover Commission on the reorganization of the executive branch of the government.

Must Accept Controls—These men believe the controls—even though they are unpleasant—must, for the time being, be accepted philosophically. They think the Communist danger is real and ominous. "It's better to magnify the red menace than to underestimate it," they point out.

To roll with the punches on controls, to accept them as philosophically as possible, these men recommend that you tackle the problem just as you would any management headache. Top management must take the time to understand controls in order to live with them. It is something which should not be delegated down the line. "It's surprising", they say, "how few people in top management actually take this trouble."

Talk for Yourself—In improving your government relations, Messrs. Heller and Elmendorf advise, "Don't let your lawyer do all of your thinking for you. Go to Washington, or what is even better, go to your district government office. That's what it's there for."

"The trend in decentralization of government facilities and authority is good and goes a long way to afford business executives more prompt action. Above all, avoid bringing pressure on your congressman to secure action. He already has too much to do, and his job is to hold the executive responsible, not to administer the laws. Moreover, that kind of maneuvering tends to annoy your congressman and alienate the co-operation of the government agency."

Work with Agencies—These management consulting men feel that too few top executives take a personal interest in working with control agencies, particularly at the district level. It is inevitable in a country as big as ours with so many diverse interests brought about by different geographical conditions that there be a concentration of harassed government people in one place—Washington. There is too much destructive criticism of what is termed the "District of Confusion." Much of this running to Washington to talk to top brass is unnecessary and ineffective.

They also feel that business relations with government won't improve until a psychological block is overcome. Too often, they believe, a business man approaches a government official with the idea that he's dealing with just another bureaucrat. "The majority of those in important government posts," says Mr. Heller, "are able, sincere men motivated by a desire to do public good. I wouldn't do what many government people do for their money."

FREDERICK S. BLACKALL

". . . *We need constant programs for replacing obsolete machinery*"

"In dealing with many of the people in the lower echelons of government service," says Messrs. Heller and Elmendorf, "businessmen must resign themselves to the fact that no profit motive exists in government, so efficiency is bound to lag."

Government Needs Help—Still another, and probably the most important, step in improving Government-business relations is for industry to detach more of its top men for nonpolitical government jobs. A scarcity of good manpower has reached chronic proportions in Washington today. Industry "can protect the interests of both itself and the public by lending its personnel." Messrs. Heller and Elmendorf think that on the whole, the use of industry advisory committees is beneficial, but that the practice can easily lead to abuse, particularly when one man gets five or six requests to serve on different committees.

"We, Not They"—They also recognize that a company being investigated by a government agency, such as the Federal Trade Commission or the Department of Justice, would have a natural reluctance prompted by a sense of self-preservation, to lend executive manpower for government work, even to some agency with an entire different function, like the National Production Authority.

The management consultants point out that our government is so big and complex that correlation between agencies and departments is well-nigh impossible. Businessmen cannot afford to let tough and sometimes unfair prosecution of the laws deter them from recognizing that they can make a real contribution to good government by cooperating in providing man power. Government is "we", not "they."

Industry is in grave danger of "losing its birthright if it's not well represented in Washington," points out one business man who has had broad experience in both industry and the government. He believes business men should welcome, not shun chances to serve part time on government committees and full time for relatively short periods with government agencies. Industry "needs business statesmanship," he says, "and it can best develop it by lending its executives to government agencies where good counsel is now solely needed. By co-operating more closely, industry and Washington can narrow their present "unduly wide" areas of difference.

More Industry in Government—Vergil D. Reed, vice president of the advertising firm, J. Walter Thompson Co., New York, who also has had wide experience as a gov-

(*Please turn to Page* 517)

How To Do Business Under Government Controls

ARE YOU having trouble keeping up to date on government controls on production?

If you are, the next 11 pages are for you. In them STEEL presents digests of production controls and tells you what they require or permit you to do today.

Seven Controlled Materials Plan regulations and nearly a hundred materials control orders plus many amendments to them have been issued since government controls were put into effect in the latter part of 1950.

What a control order meant when it originally was issued and what it means today after amendments may be far different.

Shortcut—The following digests by STEEL cut across this unending Washington wordage and legalistic phrases and tell you just what the score is today on materials controls affecting the metalworking industry.

Kingpin in controls is the Controlled Materials Plan, which went into effect July 1, 1951, replacing a priorities system that was hastily put together as a temporary measure after outbreak of the Korean war. The Controlled Materials Plan, commonly referred to as CMP, considers steel, copper and aluminum as master keys in our economy and sets them up as controlling materials. Even so, they can't do the whole job, so in controlling and directing industrial production the National Production Authority implements the CMP by "M" or limitation orders.

The Line-up—Because of its keystone importance, the Controlled Materials Plan leads off the digests. Next comes some information about a procedure to expedite production of critical components for "B" products under the CMP. Following it in alphabetical order are digests of the current status of the "M" orders.

If you want the complete order, regulation or amendment on any of these controls, write to NPA Distribution Section, First Basement, New GAO Bldg., Washington 25.

To continue to keep up to date on NPA controls, watch the "Checklist on Controls" which appears each week in STEEL. Changes on approximately 40 orders are in the making now in Washington, and soon will come forth. Controls are destined to become tighter early in the new year, for Washington officialdom is urging that "the butter be spread thinner and the guns thicker."

Controlled Materials Plan

BASIC RULES governing acquisition and distribution of copper, steel, and aluminum in mill shapes and forms are contained in seven regulations which, when taken together, form the Controlled Materials Plan. These regulations are applicable to all users of controlled materials in mill forms and shapes.

CMP Reg. 1 provides the basic rules. It tells a user of controlled materials how he may obtain an allotment and establishes the procedure by which he may determine his permitted level of production. It also sets out the rules for acceptance or rejection of authorized controlled materials orders placed in accordance with allotments. All producers are divided by the order into two classes, the maker of a custom item built to specification of the customer, an "A" product, and the maker of the mass produced commodity or component, a "B" product. Once the division is made, rules for obtaining allotments and authorized production schedules vary. Under this order as it is now amended controlled materials orders accepted by the mill which are normally valid for only a single quarter may be carried over 15 days into a new quarter without charging allotments for the later quarter.

Direction 1 to CMP Reg. 1 establishes a procedure by which small users of steel, copper and aluminum can obtain metals without filing applications for authorized pro-

duction schedules and allotments. Ceilings on small-user allotments have been substantially hiked for the second quarter of 1952.

Imported steel acquired before landing or acquired from an importer may be used to increase authorized allotments under Direction 4 to CMP Reg. 1. This same exception is not applicable to aluminum or copper. Producers using imported steel may produce in excess of authorized production schedules but may not increase their use of copper or aluminum beyond allotment limits.

Users of conversion steel may use their allotments to buy finished steel products. They can without producing allotments order the greater quantity of semifinished steel needed by the conversion mill by certifying their orders under Direction 8.

CMP Reg. 2 limits inventories of controlled materials to a 45-day supply in the case of steel. Maximum copper inventories are limited to a 60-day supply while aluminum inventories are limited to 45 days. An exception takes care of contractors working on the aircraft program identified as "A-1" in so far as aluminum is concerned.

CMP Reg. 3 describes the preference status of controlled materials orders as well as orders for noncontrolled materials to be used in connection with a controlled materials allotment and authorized production schedule. The order makes it clear that all authorized controlled materials orders are to be given equal treatment on a "first-come, first-served" basis. Similarly, DO ratings to buy noncontrolled materials to be used in connection with authorized production schedules and allotments will be treated on an equal basis with all other DO-rated orders.

CMP Reg. 4 sets out the rules for acceptance of controlled materials orders by warehouses and distributors. The rules are spelled out in greater detail for steel warehouses in Order M-6A, M-82 for brass mill warehouses, M-86 for copper wire mill distributors, and M-88 for aluminum distributors.

CMP Reg. 5 provides the rules by which contractors obtain authorized construction schedules and allotments of controlled materials. The construction program is actually handled by some 14 other government agencies to which NPA has granted authority. The order parallels the rules in CMP Reg. 1 for the most part and also provides a procedure by which certain construction projects using only small quantities of metal are excused from filing applications for construction schedules and allotments.

CMP Reg. 6 provides rules by which all segments of industry can obtain maintenance, repair and operating supplies without applying to NPA. A pending amendment will allow industry to self-certify requirements for metal used in connection with new equipment. A formula is provided to determine the amount of metal which can be obtained for MRO.

CMP Reg. 7 establishes a mechanism by which repairmen can obtain necessary steel, copper and aluminum. Under a new amendment, repairmen will be able to obtain materials needed to install equipment in residential property.

"B" Product Components

A SPOT scheduling and expediting procedure to obtain maximum production of critical common components (valves, fittings, antifriction bearings, fasteners etc.) has been developed by the control agencies. The procedure is implemented by a policy directive rather than by issuance of a formal order by NPA.

In many respects, the plan which became effective Jan. 1, 1952, follows the procedure laid down in the Component Scheduling Plan of World War II. That plan was formalized ultimately by issuance of Order M-293 of the War Production Board.

Informal—For the present, the NPA plan is informal. It calls first for issuance of directives in cases where inability of a manufacturer to place an authorized controlled materials order will result in failure to deliver a product on schedule to the military. Individual attention is to be given to all cases where producers of "B" product components important to the military programs have been unable to obtain acceptance of ACM orders in accordance with allotments.

A Promise—A second point of attack is to determine the producers of "B" components whose rates of delivery in the quantities and at the times needed to maintain schedules are threatened because of fourth or first-quarter allotment levels or material delivery dates. In those cases, there is a tacit promise of supplemental allotments.

The Outlook—For the future, the aim is more balanced and adequate programming so that once the critical common components are identified, 100 per cent of the requirements for those items in terms of controlled materials can be obtained. Scheduling and expediting units in the industry divisions will, where necessary, see to it that deliveries for military and key expansion programs are made even if it means deferral of certain nondefense orders already in production. Where the bottleneck is competing military programs, a relative urgency list will be used. For the moment, first priority will be given to the airplane programs and the bottlenecks in component production which are slowing plane deliveries.

As a further step, NPA is requiring contractors on construction jobs to file supplementary reports estimating requirements for components and equipment also needed by military end-product programs. NPA promises deferral of construction jobs standing in the way of obtaining equipment needed by the military.

Aluminum

BASIC RULES governing distribution of aluminum in controlled materials forms and shapes are contained in CMP Regs. 1 and 3. Rules covering production of aluminum are contained in NPA Order M-5.

As now written, CMP Reg. 1 provides rules for scheduling and accepting authorized controlled materials orders. It also provides for issuance of production directives under terms of which producers are told what to make and quantities of each controlled materials form that will be needed to support program determinations.

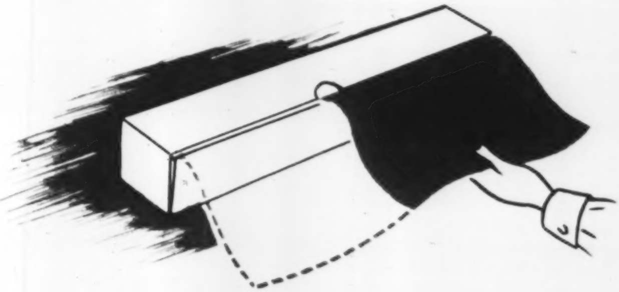
Aluminum producers, unlike the producers of copper and steel, are required to hold a 15 per cent reserve until 15 days before expiration of lead time. The reserve is to be used to fill late orders. Producers are given the right to select which authorized controlled materials orders they will accept within the 85 per cent quota. The right to pick and choose among customers is limited by terms of the order. Producers are required to accept orders of the military and the Atomic Energy Commission which are identified with allotment symbols "A," "B," "C" and "E" if there are any empty spaces on mill schedules when the orders are received. Orders of the makers of metalworking equipment must be similarly handled.

After Oct. 1, producers could deliver only against authorized controlled materials orders under fourth-quarter allotments. A 7-day carryover of orders accepted for delivery in the third quarter was permitted. Starting with the first quarter of 1952, the carryover will be 15 days under provisions of CMP Reg. 1.

Aluminum Scrap — Distribution of aluminum scrap is controlled by NPA Order M-22 as amended Dec. 17. The order requires segregation by alloys with a ban on mixing one alloy with another by generators. Scrap generators and other owners are required to dispose of scrap to producers, smelters, reclaimers, fabricators or dealers only. Deliveries are required at intervals of 30 days or when a carload is acquired, whichever is a shorter period of time. The order also limits use of aluminum scrap to producers, smelters, reclaimers and fabricators, with specified exceptions for reuse of metal by foundries and generators who use aluminum scrap in normal operations.

The order also bans toll agreements without the prior written consent of the NPA. Primary producers are limited under terms of a directive in the amount of scrap they can receive. A similar limit will be applicable in the first quarter of 1952. It is expected that this restriction will be buttressed by amendment of the order so as to require allocation authorizations to obtain aluminum scrap.

Aluminum Foil — Conversion of aluminum foil generally is controlled by provisions of NPA Order M-67 as amended July 27, 1951. The order does not apply to amounts of aluminum foil to be converted for insulation or aluminum cap liners or other packaging closures which are controlled by provisions of NPA Order M-26, as amended.



Inventories are limited to 60 days or minimum practicable working levels, whichever is less. Restrictions on use range from an unlimited right of use in the case of antibiotics to 50 per cent in the case of household, florists, gift wrapping etc.

Destructive Uses—Use of aluminum for destructive purposes is controlled under NPA Order M-84. The order aims at conservation by restricting its use to the minimum amounts and lowest grades needed for particular uses. Standards imposed by the order are those of World War II and are considered unsatisfactory both by makers of steel and aluminum castings.

The order also provides a means by which aluminum for listed purposes can be obtained in limited amounts under a self-certification procedure.

Distributors — Procedure by which aluminum distributors can obtain replacement of inventories used to fill authorized controlled materials orders is established by NPA Order M-88. The order supplements CMP Reg. 4 which carries the basic rules for accepting authorized controlled materials orders by distributors and warehouses.

Aluminum distributors do not obtain allotments of controlled materials. Instead, after receiving an "AM" number in the 9000 series from NPA, the distributor orders from an aluminum producer, the same quantity of each form and shape which he delivered during the preceding month against authorized controlled materials orders. Producers are not required to fill the orders of distributors who are not historical customers.

The order also provides for accepting orders which are not authorized controlled materials orders. Acceptance is limited to a maximum of 5 per cent of total sales from stock during the preceding month. Distributors are given the right to reject ACM orders which exceed certain maximum amounts. NPA, however, reserves the right to earmark particular aluminum products in distributors' inventories for special treatment.

Inventory Restrictions — Inventory restrictions on aluminum castings and forgings are contained in NPA Reg. 1, the basic inventory regulation. Supplies are limited to 45 days. (See Table IB, NPA Reg. 1, as amended October 22, 1951.)

Antimony

ANTIMONY inventories are held to a 60-day supply at regularly scheduled rates of operation or a "practicable minimum working inventory," whichever is less under NPA Order M-39, issued Feb. 16, 1951. A scrap dealer may not accept deliveries unless, in the preceding 60 days, he disposed of scrap in an amount at least equal in weight to his inventory of antimony scrap on the date of acceptance, exclusive of the amount delivered.

Imports acquired prior to landing may be accepted even though the net effect may be to exceed inventory limits. In that case, no further deliveries from domestic sources may be received until inventories are reduced to permitted maximums.

Reports are required on Bureau of Mines Form 6-1016 M on or before the 20th day of the month from any person who during the preceding month has produced, consumed, imported or shipped or has in his possession 2000 lbs or more of antimony. The order applies to antimony ores and concentrates, antimony metal, antimony oxide, antimony sulfide and antimony scrap.

Automobile Wreckers

TO INCREASE availability of steel scrap, NPA issued its order M-92 Dec. 11, 1951, covering automobile wrecking yards.

This order required an inventory report from automobile wreckers by Dec. 20, 1951, covering the number of motor vehicle and car-units and the poundage of loose scrap. It also limits auto wreckers in their acceptance of delivery of motor vehicles or car-units; requires quarterly turnover of motor vehicles manufactured prior to 1946, and car-units; and says that auto wreckers must comply with NPA allocation directives at any time.

Automobiles

A FORMULA for dividing controlled materials among passenger automobile manufacturers is provided by NPA Order M-68. It limits the number of passenger cars which may be equipped with automatic transmissions.

Use of primary aluminum in manufacture of engine pistons is barred. However, secondary aluminum produced from remelted scrap may be used.

Bismuth

BISMUTH inventories are limited to a 45-day supply or minimum practicable working levels under an amendment to NPA Order M-48. Persons who have more than 100 pounds of bismuth in inventory or who use or ship more than 100 pounds must report on or before the 30th day of the month covering operations in the preceding month. The form to be used is NPAF-40.

Limitations on use of bismuth are scheduled to be eliminated about the first of the year because of the easing of the supply-demand picture. At the same time provisions which required producers to set aside 20 per cent of production to be delivered against the specific authorization of NPA are scheduled to be lifted. Producers are required to honor rated orders up to 50 per cent of scheduled production in terms of bismuth content during the month. Dealers need not accept rated orders for shipment in any one month of a total weight of bismuth in excess of 25 per cent of the total quantity available in terms of bismuth content during that month.

Brass Mill Distributors

REPLACEMENT of distributors' inventories of brass mill products used to fill authorized controlled materials orders is provided by NPA Order M-82. Distributors are given the right to self-certify their orders identified with the allotment symbol "X-6".

The order also provides a means of increasing the levels of inventories. Distributors are permitted to self-certify up to 5 per cent of the difference between the inventory of the current month and average monthly inventories during the period beginning Jan. 1, 1947, and June 30, 1950.

Brass mills are given the right to reject orders of distributors with whom they did not do business during the base period. Similarly, orders may be rejected for products which distributors did not order from the mill during the base period.

The order also supplements the rules relating to acceptance of authorized controlled materials orders by distributors (CMP Reg. 4). Distributors may reject orders for more than 500 pounds of any one brass mill product, or 50 per cent of inventory, whichever is less.

Cadmium

CADMIUM restrictions have been eased somewhat since NPA Order M-19, Jan. 1, 1951. The order as it now stands specifies the permitted use of cadmium in the manufacture of some pigments, silver brazing and copper base alloys, low melting point alloys, zinc base alloys, type metal, lead-base alloy, "secret" items to the extent that certification of engineering necessity accompanies a military or AEC order, standard cells, electrolytic testers for storage batteries, cadmium impregnated silver or carbon alloys, bearings for rolling mills and heavy duty diesel engines, cadmium chemicals and copper tinsel wire.

In each of these classifications

the order reaches down and prescribes either the percentage of cadmium which can be used or the purpose to which the cadmium-containing metal may be put. The order also describes in detail the products which may be cadmium plated. These include functional parts which may or do get a salt water bath, ferrous hardware for aircraft, operating parts of electrical controllers and switches and some electronic and marine hardware.

Cast Iron Car Wheels

SCRAPPED cast iron car wheels can be used only in the making of new cast iron wheels under NPA Order M-64, revised May 28, 1951. Limitation on use of scrapped cast iron wheels is waived on authorization in writing by the NPA. The order also deals with disposal of used rails and axles.

Chromium, Chromium Nickel

RESTRICTIONS on use of chromium nickel iron and steel alloys for heat and corrosion resistant purposes are contained in Schedule C of NPA Order M-80. The restrictions apply to specific end products.

The schedule bars melting, processing, fabricating, delivery or use of a type of material contained in the schedule with a higher nickel or nickel-plus chromium content than is specifically authorized. The order also bars orders specifying higher temperature requirements than those needed for final operation of the end product.

In redesigning or rebuilding equipment or parts for uses permitted by the schedule, no person is permitted to increase the weight of the heat resistant chromium or chromium nickel iron or steel alloy in any unit by more than 10 per cent of the weight of iron or steel contained in the original design of the unit.

Exceptions are made for contracts which can be completed within 60 days of the effective date if it is impracticable to change specifications within that time.

Cobalt

THE ENTIRE supply of cobalt is allocated by NPA under Schedule 2 to NPA Order M-80.

Allocation rules do not apply to persons who will receive less than 25 pounds of cobalt from all sources during any one month and who certify the facts to their supplier. Deliveries of cobalt-bearing scrap and ores and concentrates are not subject to allocation. Use of such ores and concentrates however, are limited by terms of allocation certificates when used as a source of cobalt in commercial melting and manufacturing.

As of Sept. 1, 1951, the use of cobalt was barred in coloring glasses, glass or porcelain enamels, color oxides, glass batch colors or paint or plastic pigments. Use is permitted in the making of optical or signal glass, decolorizers for glass and white ware, artists' colors and color stabilizers in paint.

Use of cobalt is barred also in the manufacture of fertilizers; feeds for poultry, dogs and cats; and magnets used in appliances, toys, games, musical instruments, electric trains, novelties and coin rejecters.

Magnet steel containing more than 20 per cent cobalt is barred except where needed to fill rated orders. Similarly, cast magnets containing more than 30 per cent cobalt are out for the duration except for filling of rated orders. No cobalt can be used for paint driers in exterior house paint.

Columbium, Tantalum

NOW SO SCARCE as to make it seem impossible to supply the most pressing needs of the military, columbium and tantalum are subject to complete allocation by NPA under Schedule 5 to NPA Order M-80. Exemptions to allocation provisions cover small users who receive ten pounds or less monthly; deliveries of pure tantalum and columbium; and deliveries of columbium and tantalum ores, concentrates and scrap.

Generally, columbium and tantalum bearing steels may be produced, sold, delivered or purchased only on authorized controlled materials order (ACM) from the Defense Department or Atomic Energy Commission or from manufacturers of Class A or Class B products made in whole or in part from such steel for the military or AEC. ACM orders for the aircraft program must carry a certificate indicating approval of the Aircraft Production Resources Agency.

Specification controls contained in the schedule do not apply to production of welding rods, welding electrodes or high temperature alloys used in power generation or chemicals industries or to approved orders in the aircraft program.

Communications

RULES for procurement and use of materials for maintenance, repair and operating supplies and minor capital additions in the communications industry are contained in NPA Order M-77, issued July 27, 1951. Operators of communications systems obtain quarterly allotments of controlled materials for MRO supplies and operating construction.

Statements of requirements are filed on NPAF-117, 60 days in advance of the quarter in which the materials will be needed. The allotment symbol U-2 is assigned as identification for authorized controlled materials orders, and the related rating DO-U-2 is assigned for noncontrolled materials and component orders.

Components

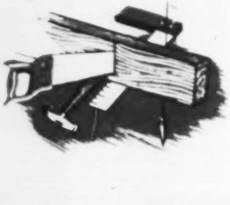
A CEILING on compulsory acceptance of rated orders is provided by NPA for seven types of components or parts under NPA Order M-17, as amended Mar. 23, 1951. Computation of the ceiling is based on average monthly shipments during the base period from Jan. 1, 1950, through Aug. 31, 1950.

Affected products and the ceiling on acceptance of rated orders are: Pressed steatite electrical ceramic products, 15 per cent; extruded steatite electrical ceramic products, 20 per cent; machined steatite electrical ceramic products, 20 per cent; electron tubes (except power tubes), if produced by only one company, 50 per cent, if produced by more than one company, 25 per cent; fixed composition resistors, 25 per cent; rigid electrical conduit electrical metallic tubing, 50 per cent.

Construction

CONSTRUCTION of all types of buildings using more than a minimum amount of controlled materials is barred by NPA Order M-4A unless the prime contractor receives either an authorized construction schedule and related allotment under CMP Reg. 6 or is permitted within stated limits to self-authorize the materials needed for the job. The order also bars use of copper and aluminum in construction for specified purposes.

The order prevents construction of recreational, amusement or entertainment projects listed unless the contractors can go ahead without priority assistance of any kind. Use of more than stated amounts of controlled materials is barred. The order carries the usual adjustment and exception provisions.



Construction Machinery

A CEILING on compulsory acceptance of rated orders for construction machinery is set by NPA Order M-43. Manufacturers of listed

equipment obtain permission to reject rated orders calling for delivery in a single month of more than 50 per cent of average monthly shipments of the same machine during the six-months period ended June 30, 1950.

Orders placed less than 45 days before the month in which delivery is required may also be rejected. The order provides for scheduling construction machinery production. No use of this power has yet been made by NPA.

Consumer Durable Goods

MANUFACTURERS of consumer goods (other than automobiles) are given discretion as to how they will use their allotments of steel, copper and aluminum under NPA Order M-47B. Allotments provided for one product code may be used by a manufacturer to boost production of any other product within a single group of products. All affected products are classified in one of four groups by NPA.

M-47B and M-47A as reinstated Oct. 11 bar the use of copper and aluminum for any ornamental or decorative purpose in connection with the manufacture of listed consumer products. An exception to this ban is use of copper and aluminum in end products "primarily ornamental or decorative."

Copper

DISTRIBUTION of brass mill, copper wire mill and copper foundry products is generally controlled by CMP Reg. 1 and CMP Reg. 3. Rules for scheduling and accepting authorized controlled materials orders as well as machinery for issuing production directives by NPA are contained in NPA Order M-11, as amended.

Producers are compelled to accept authorized controlled materials orders of the Defense Department and the Atomic Energy Commission carrying the allotment symbols "A," "B," "C" and "E" unless order books for the product wanted are filled for the month. Otherwise the producers have the right to decide which ACM orders they will accept or reject until 15 days before expiration of leadtime for the quarter. In the last 15-day period, ACM orders must be accepted on a first-come, first-served basis. Manufacturers of metalworking equipment requiring controlled materials are placed in the same category as the military and AEC in so far as compulsory acceptance of ACM orders is concerned.

Producers' order books for a quarter must be opened 90 days before the start of the quarter.

Raw Materials—Copper raw materials are allocated under NPA Order M-16 as amended. Application for allocation authorizations generally are made monthly on form NPAF-83. Foundries using less than 10,000 pounds monthly receive their allocations covering a period of six months. Applications covering the second and third quarter of 1952 are due Jan. 10.

Foundries using more than 10,000 pounds and less than 100,000 pounds obtain allocations covering a full calendar quarter. Applications for second-quarter allocations are due by Mar. 10, 1952.

Specified users of copper raw materials are exempt from the allocation requirements, as provided by the order. For purposes of the order copper raw materials include: Refined copper, brass mill scrap, copper base alloy scrap, unalloyed copper scrap, fired and demilitarized cartridge and artillery cases, copper and copper-base alloy shot and waffle and copper precipitate. Copper powder is now a controlled material.

The order also bars toll agreements unless specifically approved by the NPA and sets limits on accumulation of inventories. Under Direction 1 to NPA Order M-16, the holder of an allocation certificate is permitted to order in advance for delivery in the following month copper raw materials up to 50 per cent of the amount of the allocation certificate for the current month.

Use of copper and copper-base

alloys in the manufacture of some 36 listed building materials is barred by the NPA Order M-74, as amended Aug. 3, 1951. High on the banned list are copper gutters and downspouts.

Copper Wire Mill Products

DISTRIBUTORS of copper wire mill products are permitted to place authorized controlled materials orders to replace inventories under NPA Order M-86. An allotment symbol "X-6" is assigned to identify the orders.

Starting Nov. 1, 1951, distributors were allowed to order for delivery after the fourth quarter a quantity of copper wire mill products equal to 100 per cent of deliveries to fill authorized controlled materials orders in the preceding month measured in pounds of copper content.

Mills may reject orders of distributors with whom they did not do business during the calendar year 1950. Orders may also be rejected which call for delivery of products which the mill has not previously supplied to the distributor.

M-86 supplements CMP Reg. 4 which contains the general rules on acceptance of authorized controlled materials orders by distributors. Customers' ACM orders calling for more than 500 pounds of copper content of any item except in sizes 4/0 and larger may be rejected. Larger sizes may be rejected if in excess of standard mill single reel lengths. The order also provides a means by which distributors may accept orders for direct shipment from the mills to the customer.

Electric Utilities

RULES for procurement and use of controlled materials by electric utilities are contained in NPA Order M-50, as amended Aug. 21, 1951. The order modifies the application of CMP Regulations 2 (inventories) and 6 (construction) in so far as electric utilities are concerned.

The allotment symbol H-4 is assigned to identify the authorized controlled materials orders of electric utilities. The related DO-H-4 rating is used to identify noncontrolled materials orders and components. The order is administered by the Defense Electric Power Administration under terms of Delegation of Authority No. 11 issued by the National Production Authority May 4, 1951.

Information required as a basis for obtaining MRO or construction schedules and materials allotments must be filed with DEPA rather than NPA.

Ferroalloys, Ferroalloy Products

ALL melters and processors using certain ferroalloys and ferroalloy products must file proposed melting or processing schedules under NPA Order M-80, issued Aug. 15, 1951.

Affected by the order are boron, calcium, chromium, cobalt, columbium and tantalum, manganese, molybdenum (except molybdenum in steel scrap, pure molybdenum metal, or scrap molybdenum metal), nickel, silicon, titanium, tungsten (other than pure tungsten), vanadium and zirconium. Melting and processing schedules must be approved by NPA which reserves the right to change any proposed schedule before approval.

Inventories are restricted to a 45-day supply for all of the alloying metals except ferromanganese and ferrosilicon. In those two cases the inventories are held to practicable minimum working levels under NPA Reg. 2. Imported alloying metals may be acquired prior to landing and received even though receipts will create excess inventories. In such cases, additional receipts from domestic sources may not be acquired until inventories are drawn down below the 45-day limit.

Schedules attached to the order establish procedures for acquiring allocation authorizations for cobalt, columbium and tantalum, and molybdenum, nickel and tungsten.

Distribution of pure molybdenum and tungsten is controlled by NPA Order M-81.

All applications for allocation authorizations are due on form NPAF-114 by the seventh of the month, with deliveries scheduled for the following month.

Graphite, Electrodes

QUARTERLY allocation authorizations for artificial graphite and carbon electrodes are provided by NPA under its Order M-66, revised June 30, 1951. Inventories are limited to minimum practicable working levels under the NPA Reg. 1, as amended Oct. 19, 1951.

Insect Screening

COMPULSORY acceptance of rated orders for insect screening is limited under NPA Order M-42, issued Mar. 2, 1951. Producers are not required to accept rated orders received less than 15 days prior to the first of the month in which shipment is required.

No producer need accept rated orders for shipment in any one month in excess of 10 per cent of scheduled production for that month. Object of the order is to provide equitable distribution of rated orders among all producers.

Iron and Steel Scrap

EMERGENCY SCRAP allocations are made under NPA Order M-20, amended May 28, 1951. Unlike most of the allocation orders, no regular allocation formula is provided.

The order also restricts inventories of both shippers and consumers.

No shipper is allowed in a 60-day period to accept deliveries which would increase inventories beyond practicable minimum working levels or beyond the average inventory position during the preceding 60 days.

In the case of consumers, the

rule is quite different. NPA takes the authority of establishing inventories (emergency) almost on a plant-by-plant basis. If no such emergency inventory is established, consumers are held to the minimum practicable working inventories of NPA Reg. 1 governing inventories. In computing inventories, consumers are required to include scrap in their possession and scrap held for their account.

Rules covering used rails and axles are contained in NPA Order M-64, while rules covering scrap acquired by automobile wreckers are included in NPA Order M-92.

Jacks

MANUFACTURE or assembly of jacks not specifically listed in schedules annexed to NPA Order M-83 are barred.

In addition, jack manufacturers are required to comply with stated specifications and other standards. The order applies particularly to producers of mechanical, hydraulic, air and electrically operated jacks. It does not apply to the manufacturers of repair parts. The order was issued Aug. 31, 1951, and became effective Oct. 1, 1951.

Laboratories

TECHNICAL and scientific laboratories obtain assistance under NPA Order M-71 in procuring supplies and materials. Laboratories use the allotment symbol "XI" to obtain specified small quantities of controlled materials and use the same symbol with the "DO" rating to buy noncontrolled materials, all on a self-certification basis. If larger amounts are needed, NPA can and will supply a quarterly quota. Testing laboratories are entitled to benefits of the order.

Trial production runs of experimental models are barred unless specific authorization is obtained from NPA. Production of experimental models is also restricted.

Lead

PRIMARY soft pig lead and imported lead are subject to allocation under NPA Order M-76 as amended Oct. 29, 1951. Allocations of imported lead became effective Jan. 1, 1952.

Applications for allocation must be filed not later than the 10th day of the month preceding the month in which delivery is required. Allocation authorizations authorize acceptance of delivery of a specified quantity and grade of metal, provided that a purchase order is received by a refiner, producer or importer not later than the fifth of the month in which delivery is required.

The small user exemption applies to deliveries from all sources of less than ten short tons in any calendar month. A 25 per cent ceiling on acceptance of rated orders by producers is provided. In addition producers get a 15-day lead time and are not compelled to accept orders calling for delivery in any shorter period.

NPA Order M-38 restricts the use of lead and lead products, places limits on lead scrap toll agreements and on inventories of pig lead, lead base alloys and lead products. The order was revised on May 28, 1951, and again amended on July 26.

Nonproducers of pig lead are limited to 100 per cent of base period use (6 months ended June 30, 1950) in manufacturing, treating, installation or construction or maintenance, repair and operating supplies. This restriction does not apply to the filling of rated orders.

Toll agreements without approval of NPA are barred. This does not apply to agreements covering lead scrap delivered by the General Services Administration or the Armed Forces nor does it apply to lead base alloys used and owned by printers and publishers for printing plates. Inventories are limited to a 30-day supply or a practicable minimum working level, whichever is less. Scrap dealers' inventories are also restricted. Special rules govern printers and publishers.

A new order will restrict distribution of lead scrap so that it would be directed to points of maximum recovery. It will also further restrict inventories of lead scrap.

Marine MRO

PROCEDURE by which maintenance, repair and operating supplies and minor capital additions can be obtained for water transportation systems is established under NPA Order M-70, as amended July 6, 1951. The allotment symbol R-9 is assigned for authorized controlled materials orders under self-rating procedures and the related priority DO-R-9 is used for components, "B" products and noncontrolled materials.

Metalworking Machinery

FACED with the difficulty of doubling the production rate of machine tool builders in the next year, NPA provides tight controls on acceptance and scheduling of orders as well as deliveries. Provision is also made, through the device of "pool orders," for advance placement of orders by the General Services Administration with the tool builders.

Under NPA Order M-41, as amended Nov. 8, 1951, NPA bars acceptance of unrated orders for machine tools by builders calling for delivery before Feb. 1 of this year.

After date producers are forbidden to make deliveries against unrated orders except in the case of a builder operating at less than 70 per cent of base period production rates.

The Pattern—On and after Apr.

1, 1952, producers are required to schedule production for the fourth month following. No delivery can be made against an unrated order unless all rated orders scheduled for delivery in that month have been filled. If a producer has scheduled more rated orders than he can deliver in any one month, he must schedule up to 70 per cent of his capacity for military orders and use the balance to fill other rated orders.

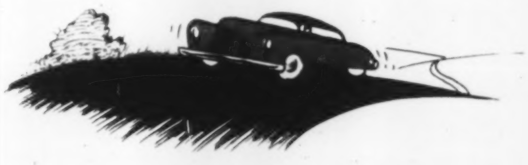
Finally the order includes "pool order" rules originally contained in Order M-40, revoked Nov. 9, 1951. "Pool orders" for tools are placed by GSA on certification of the NPA. The idea is to allow builders to schedule production in advance of actual orders from the military or defense contractors. Machinery produced under pool orders may be used to fill later orders of the military or defense contractors or other manufacturers holding rated orders. Machinery built under pool orders may not be used to fill unrated orders. GSA will accept delivery and pay for any machinery for which a rated order is not received before the date of scheduled delivery.

How To Get a Rating—Under NPA Order M-41A, issued Nov. 8, 1951, NPA prescribes the rules by which priority ratings for machine tools can be obtained. In general, a rating will not be granted to the manufacturer of "B" products except where Defense Department or Atomic Energy Commission orders are involved.

There are two exceptions. One covers the case where worn-out equipment must be replaced. The second exception covers manufacturers of "B" products whose rate of production now exceeds the rate during the first quarter of last year.

NPA points out that the second exception will have little or no value except for manufacturers actually engaged in production for the military, defense supporting industries or industrial expansion. All other manufacturers are being forced to operate at reduced production rates.

Applications for ratings are made to NPA on form NPAF-138 or form NPAF-138A. About 50 types of machine tools are affected.



A Helping Hand—To assure machine tool builders of necessary materials and components, NPA provides preferential treatment under NPA Reg. 2, the basic priority regulation, and in amendments to M-1 (steel), M-5 (aluminum) and M-11 (copper) directions. Manufacturers who cannot deliver all rated orders scheduled for delivery in a month must take care of the orders of the military, AEC and machine tool builders first. Similarly steel, copper and aluminum mills must accept the orders of the machine tool builders along with the military and AEC if there are any spaces on order boards.

Mining Industry

MINE operators are given the right to use allotment symbol "H-6" and the rating "DO-H-6" to obtain limited quantities of controlled materials and other products required for maintenance, repair and operating supplies under NPA Order M-78, issued Aug. 8, 1951. The order does not apply to producers of solid fuel, petroleum, natural gas or uranium, all of which are covered by other orders. As in all cases of MRO supplies, authorized controlled materials orders are placed on a self-certification basis.

Molybdenum

THE molybdenum supply is completely allocated under Schedule 4 to NPA Order M-80, issued Aug. 15, 1951. The schedule is not applicable to pure molybdenum metal covered by NPA Order M-81 or deliveries of molybdenum ores and concentrates and molybdenum bearing scrap.

Persons who will receive 200 pounds of the metal from all sources are exempt from allocation requirements. Specification controls limit molybdenum content in steel to 2.5 per cent by weight.

Applications for allocation of pure molybdenum must be filed on Form NPAF-114 not later than 45 days before the first day of the month in which delivery is required. Allocations will be issued to the appropriate supplier at least ten days before the start of the month in which delivery is desired. M-81, issued Aug. 15, 1951 limits inventories at 60-days' supply.

Molybdenum concentrates are subject to allocation by the Defense Minerals Administration under Minerals Order No. 8 issued June 8, 1951. The order also requires monthly reports from processors.

Nickel

THE ENTIRE supply of nickel is allocated by NPA under Schedule 1 of NPA Order M-80. Use of nickel allocated is limited to purposes stated in the allocation certificate.

Only those users who will receive less than 100 pounds of nickel a month from all sources are exempt from allocation requirements on furnishing a certificate to their suppliers.

More "Death Sentences"—The same schedule bars use of nickel, secondary nickel or scrap, containing at least 6 per cent nickel, for plating about 140 commodities. It is expected that the so-called "death sentence" will be extended to other products early in 1952. To allow manufacturers to dispose of nickel anodes in inventory, NPA divided the list into two parts. Platers of List A products may use anodes in inventory on Mar. 15, 1951, while platers of B products can use inventories acquired before Apr. 15, 1951.

Banned—Use of nickel-bearing stainless steel or high nickel alloy is barred in the manufacture of a long list of products under Sched-

ule A to Order M-80. A limited use of nickel silver is permitted for specified products only. Prohibitions on the use of nickel-bearing stainless steel do not apply to products manufactured exclusively for use on board vessels and aircraft operated by the U. S. armed forces, including the Coast Guard.

Starting in the fourth quarter of 1951, nickel supplies were allocated under the terms of an agreement developed by the International Materials Conference. In the fourth quarter, the United States obtained 65 per cent of the supply of the free world as compared with a previous 70 per cent take of the supplies of Canadian mines.

Packaging Closures

QUANTITY limits on use of packaging closures made of aluminum are contained in NPA Order M-26, as amended June 1, 1951.

The order also prescribes tin plate specifications to be used in the making of closures. These specifications vary depending on the product to be packed.

Users of aluminum packaging closures have an unlimited quota for packaging fluid milk and specified drugs. In the case of other food products and drugs, the quota is 100 per cent of the numerical quantity of aluminum packaging closures during calendar 1950. Other users of this type of closure are limited to 65 per cent of their base period use. This figure is likely to go lower in an amendment to the order designed to assure maximum use of aluminum allotments for packaging milk, drugs and other perishable foods and minimum use of allotments for making closures for packaging liquor and other less essential products.

Petroleum, Natural Gas

CONTROLLED materials needed for maintenance, repair and operating supplies by U. S. and Canadian oil and gas operators are obtained under NPA Order M-46 as amended Dec. 12, 1951. Petroleum Administration for Defense acts as claimant and administers the order under a delegation of authority.

Foreign operators are told how to get controlled materials and other needed equipment by NPA Order M-46A, also administered by PAD.

Unlike order M-46, the "A" order is applicable to construction projects of the foreign operators.

U. S. Construction—Necessary construction in the industry by United States and Canadian operators is governed by NPA Order M-46B, administered by PAD. NPA construction order M-4 is not applicable.

In addition to these three orders, there are series of PAD orders affecting the industry. Order No. 1 limits use of tetraethyl lead (automotive grade) in an effort to maintain inventories and supplies for the aviation gasoline program.

Affects Aviation Gas—Use, delivery and receipt of blending agents and feed stocks in manufacture of aviation gasoline is limited under Order 3. Order 4 puts a floor under specifications for commercial aviation gasoline.

Because of the shortage of pipe lines, PAD limited expansion of natural gas markets by restricting deliveries of such gas for space heaters and large volume use under Order 2.

Platinum

DISTRIBUTION of platinum and platinum alloys as well as its use in manufacturing is restricted by NPA Order M-54. Deliveries may be made only to dealers, refiners, processors, distributors and consumers.

The metal may not be used in manufacture of jewelry, electroplating and some 18 miscellaneous products. Accumulation of scrap is limited to a 30-day supply. Inventories are limited, under NPA Reg. 1 to a 60-day supply.

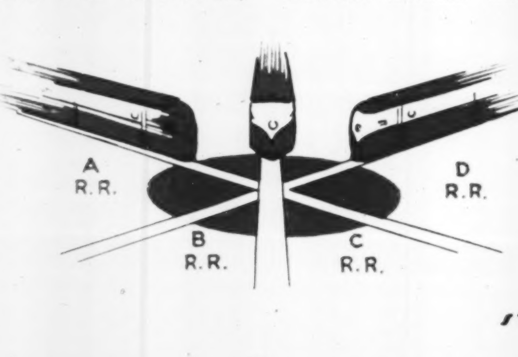
Power Equipment

SCHEDULING of production and deliveries of electric or power equipment is provided by NPA Order M-44, as amended Oct. 4, 1951. Manufacturers of specified equipment are required to report by the 15th of the month orders on hand, and the related production and delivery schedules.

Unless changed by NPA before the first of the following month, production and delivery schedules are considered frozen with no changes permitted except on written NPA approval. The freeze does not apply to manufacturers who have empty spaces on their order boards.

Railroads

UNIFORM PROCEDURE by which rail transportation systems may obtain their requirements for maintenance, repair and operating supplies is established by NPA Order M-73, issued June 28, 1951. The order provides for establishment of quarterly quotas for the operator of each railroad transportation system. Quotas are established after the filing of NPAF-105 showing quarterly requirements for MRO and minor capital additions 60 days before the start of the quarter. The allotment symbol U-3 is assigned for authorized controlled materials orders and



must indicate the quarter in which the allotment is valid.

Selenium

USERS of selenium must apply for an allocation authorization under NPA Order M-91, on or before the 10th of the month preceding the month in which delivery is sought.

The allocation authorization when issued by NPA will show the amount of selenium by grade and type he is authorized to use and the use to which the allocated amount may be put. Other uses are barred.

Users consuming less than one pound per month and generators of selenium scrap are exempt from allocation, provided that other provisions of the order are complied with.

Selenium producers are required to report monthly by letter as to inventories at the beginning and end of the month, production, sales and shipments during the month and anticipated production and receipts for the following month. Users and dealers also are required to report monthly on or before the 10th of the month following the month for which a report is required.

Steel

BASIC RULES for scheduling and accepting authorized controlled materials orders by steel producers are contained in NPA Order M-1, and its directions. The order itself is obsolete and is now being amended.

As amended, the order will provide for issuance of production directives by NPA. It also will set up procedure by which converters can obtain steel ingots and other production materials.

Old Customers First—Direction 3 to Order M-1, as presently written, provides a means by which steel producers can retain historical customer relations within the industry. Compulsory acceptance of ACM orders is limited to orders of the Defense Department, Atomic Energy Commission and machine tool buidlers identified by allotment symbol Z-2. Until 15 days before the end of lead time, steel mills may reject or accept all other ACM orders as they see fit. In the last 15 days of the lead time period, ACM orders must be accepted on a first-come, first-served basis.

The direction also contains definite instructions for opening of order books a stated number of days prior to the start of the quarter in which delivery is sought. Length of time during which order boards are open depends normally on the production pattern for the specified type of steel.

A Transfer — Inventory restrictions formerly contained in order M-1 have been transferred to NPA Reg. 1, the basic inventory regulation. Nine products affected by the transfer are roofing, galvanized and corrugated, including V-crimped and channel drains; ridge roll, valley and flashing; siding, corrugated and brick; wire, drawn; nails, steel cut, galvanized, cement coated and painted; spikes and brads, steel wire, galvanized and cement coated; staples, galvanized (farm and poultry); wire rope and strand and welded wire mesh and woven wire netting. These items are all subject to 45-day inventory limits.

Three types of alloy steel — nickel clad, inconel clad and monel clad—and two types of carbon steel—copper clad and aluminum clad are placed under 45-day inventory limits for the first time. Users are limited to 45-day inventories.

Pig iron inventories are held to 30 days while gray iron castings, malleable iron castings and steel forgings are held to 45-day inventory limits. All other steel inventory restrictions are contained in CMP Reg. 3 which provides inventory limitations on controlled materials.

Steel Shipping Drums

SALE and delivery of steel shipping drums, buckets, kits and pails are limited by NPA Order M-75, as amended. It also limits the use to which drums can be put.

A list of some 44 commodities or classes of commodities which may not be packed in drums is attached to the order. Packers are held generally to a maximum tonnage of new drums equal to 22.5 per cent of tonnage used during the base period for packing permitted commodities. Inventories are held to a 45-day supply of each size and type of drum. Packers may accept used drums from their customers on a return incentive plan if the return does not boost permitted inventories by more than one-third.

Some special purpose drums (lead-lined, rubber-lined, stainless steel and tin lined) are exempt from most of the order's provisions. Special permission to buy new drums of this type is required, if more than 25 of a particular size or type are requested.

Used drums which are 30 gallons or larger and 24-gage or lighter are exempt from the order. Milk cans are no longer defined as "drums."

Steel Warehouses

FROM DISTRIBUTORS, steel producers are required after Jan. 1, 1952, to accept purchase orders for at least 100 per cent of the base tonnage of each steel product shipped to each distributor customer during the base period (Jan. 1, 1950, through Sept. 30, 1950). These rules are in NPA Order M-6A issued Oct. 5, 1951.

Distributors are required to comply with the lead time provisions of CMP Reg. 1 and to order substantially the same products ordered during the base period. Purchase orders issued by distributors must be identified as an M-6A purchase order.

The Rules—Generally the rules for acceptance of authorized controlled materials orders by distributors are contained in CMP Reg. 4. No distributor is required

(*Please turn to Page* 518)

Windows of Washington

By E. C. KREUTZBERG *Washington Editor*

The three big events of 1952 will be the Presidential election, the debate in Congress over the foreign assistance program for fiscal 1953 and a decision on whether wage and price controls should be continued beyond June 30

SIZING UP the 1952 outlook from Washington's point of view you can take for granted the year will be a very satisfactory one in dollar volume of business and in employment. On the big underlying question of what Russia will do, majority opinion in top government circles is the present "limited" emergency is not going to expand into all-out war this year. The feeling right now is we have enough military strength—actual and potential—to cause the Russians to hold their hand. We certainly are not going to take the initiative in starting the show.

The Big Events—If we continue, as expected, to avoid outright war with the Russians, the three big events of public interest in 1952, as seen at year's end, will be the Presidential election, the debate in Congress over the foreign assistance appropriation for fiscal 1953, and the congressional debate over continuation beyond the June 30, 1952, expiration date of the wage and price controls authorized in the Defense Production Act.

Of these three 1952 developments, all highly charged with dramatic potentialities due to differing party and regional viewpoints, easily the most important one is the coming election. It will determine again whether the majority of voters want a continuation of the present regime and its policies. If the present regime is succeeded by a new one, the opportunity will be presented for a showdown as to how much of the trend toward socialism will stick permanently.

Disappointment?—In looking ahead to the election, many businessmen will be disappointed if they think that a Republican victory this year would reverse this trend to any substantial degree. The fact is political leaders of both parties think alike on certain fundamental matters. A great deal of experience has accumulated since President F. D. Roosevelt perfected his momentous invention of the use of vast public spending as a political tool. The experience has brought revolutionary changes in political philosophy. It caused many astute politicians to accept certain conclusions as unquestionable, incontrovertible fact.

In To Stay—What this philosophy boils down to, in the practical sense—and as far as business is concerned—is this: Government is in overall economic planning to stay. More and more, in 1952 and subsequently, will Washington shape the framework within which business will function.

To understand the implications, it is necessary to bear certain present-day political axioms in mind. They are *the* Washington viewpoints.

1. The public debt cannot be retired or even seriously reduced. To do so would saddle severe hardship and a lower plane of living on the voters. That would cause the party responsible to be thrown out of office, a denouement to be avoided at all costs.

2. But the public debt does not have to be retired or seriously reduced. Experience has shown that a large debt—even an increasing one—can be managed if we have a continually expanding economy, and if increments to the debt bear a reasonable relationship to total national income.

3. Smart government management, it has been demonstrated by experience, is to be depended on for maintenance of an expanding economy at all times. To achieve this condition fairly full employment must be maintained at all times, and the dollar value of business in the country must reflect a strong upward trend. There must never be another sharp business recession in this country, and there need be none if the government—by judicious use of public spending, by procurement, by

WHO TO ASK FOR INFORMATION

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Phone: Riverside 3402

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104 N. Oak Park Ave., Oak Park, Ill.
Phone: Chicago—Estebrook 8-1905-6 or
Oak Park—Village 8-3804-5

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4701 Marburg Ave., Cincinnati 9, Ohio
Phone: Redwood 2121

CLEVELAND
4614 Prospect Ave., Cleveland 3, Ohio
Phone: Henderson 1-4100

DETROIT
24100 N. Woodward Ave., Pleasant Ridge, Mich.
Phone: Jordan 4-6694 or Lincoln 5-6868

HARTFORD
10 North Main St., West Hartford 7, Conn.
Phone: Hartford 3-6271

INDIANAPOLIS
328 Chamber of Com. Bldg., Indianapolis 4, Ind.
Phone: Plaza 7382

NEW YORK
155 East 44th St., New York 17, New York
Phone: Murray Hill 2-5448

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3701 North Broad St., Philadelphia 40, Pa.
Phone: Baldwin 9-9220

PITTSBURGH
1206 Empire Bldg., Pittsburgh 22, Pennsylvania
Phone: Atlantic 1-8162

SYRACUSE
472 South Salina St., Syracuse 2, New York
Phone 2-7249

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launching of public works when needed, by generating programs for private industry, by injecting a mild dose of inflation through manipulation of interest and loan policies, and by numerous other devices does its stuff promptly and intelligently.

Cake and Eat It — Thus, political leaders believe that "we can have our cake and eat it too;" the chief rivalry between them arises out of the controversy as to which party can best carry out such a program in the interests of the country.

STEEL recently discussed the changed political thinking with one of the leading bankers in Washington and was quite surprised to learn that he regards the concepts as tenable.

"We could retire the public debt but Americans do not like austerity and would not re-elect any regime demanding of them sacrifices that might be avoided. Naturally," he said, "with these big government spending and taxing programs we have a bear by the tail and we can't let go. As long as we can provide a full workload for the country we should get along. And there is always plenty of work to be done—if we have the imagination and the initiative."

Port of Call

ONE PLACE in Washington that should be a port of call in 1952 for the great majority of manufacturers and businessmen is the new Small Defense Plants Administration. It is located in the old Washington Post Bldg. at 1337 E St. N. W. Telephone is STerling 2858; director of information is Albert J. Lubin, on Extension 3257

SDPA is getting organized to render all sorts of assistance to small business — which includes more han 90 per cent of the business organizations of the country. It is getting set up to help small firms obtain government contracts, to recommend that they be granted RFC loans, and to advise them on problems of management, taxation, etc.

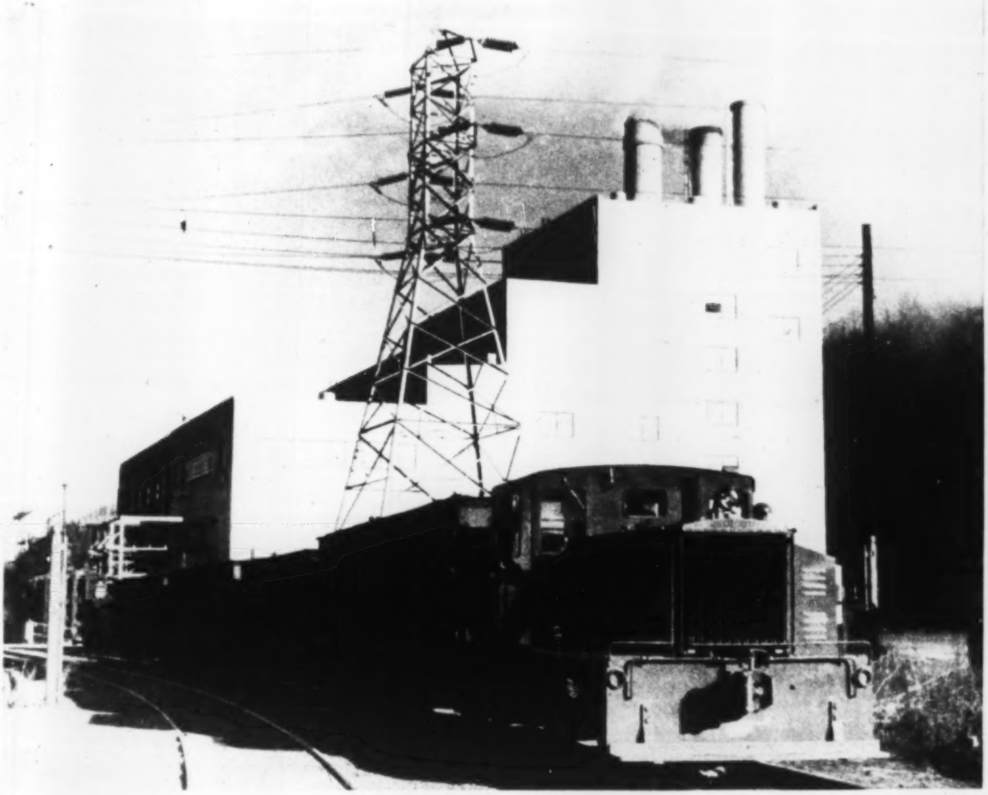
Repudiation, Nay! — What will finally be done about the national debt? Is it ever going to be paid off? Is there any likelihood of repudiation at some future time? STEEL asked some politically-minded men—in and outside of Congress. Not one of them would favor repudiation on any scale whatever, because the debt is the backbone of insurance, educational and many other institutions in which countless numbers of individuals and businesses have a stake. Repudiation would spell national ruin for them. If ever the time comes when a settlement is imperative, said several, some means would be found to do the job without loss to the debt-holders. A staff member of one of the committees of Congress suggested one way to liquidate the debt would be through conveyance of federally owned property to the debt-holders. All seemed to think that there is plenty of time to think about this problem; the matter just isn't pressing now.

Double Talk — No businessman should put a great deal of reliance on Washington assurances that inflation will be checked. On this subject there is a lot of double-talk. When you dig up the answer to the question: Who actually is hurt by doses of inflation of the kind since Korea? the answer is only the small percentage of the people who are living on fixed pensions and annuities. That group is a small unorganized minority, hence bereft of much political consideration. As to the great majority of people, they pay higher prices for the things they buy, but they have more money to spend. In the meantime, in general, everybody benefits from the increased economic activity. This latter, incidentally, is President Truman's view. In government and political circles there is no real worry about inflation—as long as it is "controlled" as contrasted with "uncontrolled" inflation. Politicians saw the light last year when such powerful groups as organized labor and the farmers rebelled against wage and price ceilings.

Everybody in Washington expects further inflation in 1952—maybe even as much of a further upward swing as we had in the six months following outbreak of the Korean war. But there isn't much concern among government officials or members of Congress over the prospect. The expectation,

Defense Department

PENTAGON PLANNING: How long controls will stay, how much civilian goods will be produced, what kind of an economy we will have rest on decisions made in conferences like this between military and civilian officials in Washington



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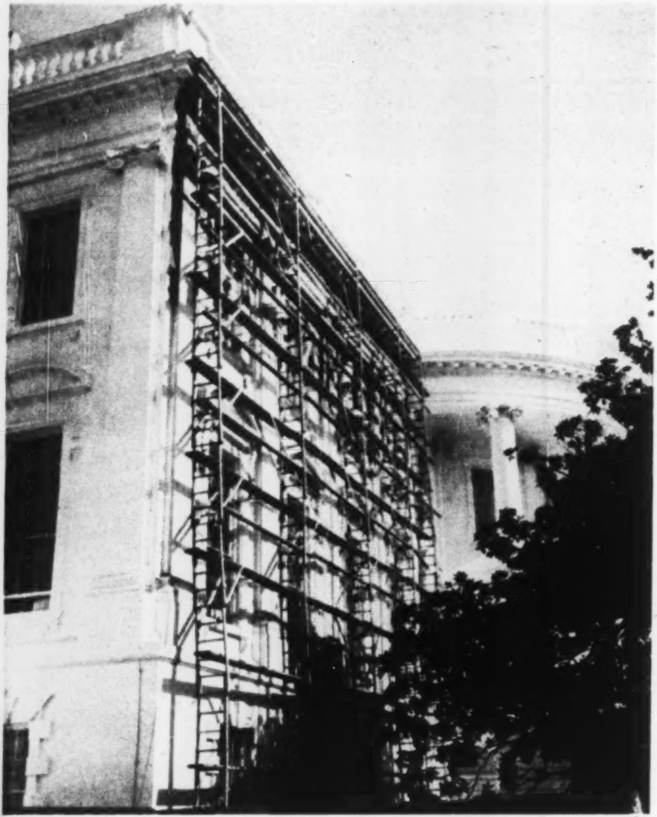

NEA

NEW TENANT, TOO?—Physical reconstruction of the White House is nearing completion. One of the major questions to be answered in 1952 is: Who will live there for the next four years

in fact, is Congress will vote for a substantial relaxation of the present wage and price controls; there are loud demands for elimination of such controls altogether.

Three Loads — When will the present work-load start to fall off? When will the government have to do something to supply a new work-load? Those are problems on which administration officials and congressmen are working right now. The picture at which they are looking is as follows: We now have three work-loads: Civilian, military, and foreign assistance. We are carrying the loads without cutting our scale of living, are, in fact, maintaining the highest plane of living in our history and the history of the world. And we are doing it without strain. We are doing it with an average work-week of 40.4 hours.

How long will this present total work-load stay intact? The two highest authorities, Charles E. Wilson, the defense mobilizer, and Manly Fleischmann, NPA administrator, say shortages of critical and strategic materials will be most acute during first half of 1952, that the situation will become easier in the second half. That, of course, allows for expanded production facilities to become operative in 1952. It doesn't necessarily signify any important diminution in the work-load during the year. Maybe there will be such diminution in the second half, and maybe there won't. In any event the work-load will begin to require some shoring up—certainly by 1953 or 1954—so let's start to prepare a program now to keep employment high and dollar volume of business ascending.

Where, O Where — Where will the additional work-load be sought when the present work-load starts to decline? Well, there will be some releases from the list of deferred public works for one thing. But main reliance will be placed on an expansion in what such pioneers as the late James A. Farrell and Samuel B. Vauclain used to call "foreign trade." Government planners do not customarily employ that homely term. They are more likely to talk about the Point Four program of rendering economic assistance to underdeveloped countries. It still boils down to the same old thing, namely, foreign trade which gives our manufacturers export orders, and our workers employment.

Mr. Farrell and Mr. Vauclain used to point out that the best way to sell abroad was to import in order to put dollars into the hands of foreign customers. But in those days that was simply a matter of enlightened policy. Today that angle is much more important. It is vital. Today we are deficient in many materials and we must import on a continually expanding scale. What is more practical, therefore, than to organize to get the maximum benefit, by exporting, from the materials we import? That's the program on which government planners are working, so they can be ready with something when the need arises. We already are exporting and importing on a large scale; this movement is to be built up to much greater proportions.

Present Accent — The move toward expanding our foreign trade is one of the big things in Washington. No fewer than 21 government departments and agencies are trying to get into the act. Head man is W. Averill Harriman, director of Mutual Security, whose Mutual Security Agency replaced the old Economic Cooperation Administration. Present emphasis is on promoting the military strength of our allies in Europe and Asia; so the whole program is due for overhaul and enlargement as soon as present defense goals are reached.

Who's Who

IN THE DEFENSE ORGANIZATION

WHENEVER you find it necessary to contact someone in government for answers to questions that affect your segment of metalworking, you'll find this directory of key personnel helpful. Many of the men whose names appear herein are industry executives intimately acquainted in the fields they now serve. They, if anyone, are equipped to answer your questions

Included in this guide

are these important agencies . . .

OFFICE OF DEFENSE MOBILIZATION

DEFENSE PRODUCTION ADMINISTRATION

NATIONAL PRODUCTION AUTHORITY

ECONOMIC STABILIZATION AGENCY

DEFENSE DEPARTMENT

SMALL DEFENSE PLANTS ADMINISTRATION

DEFENSE MANPOWER ADMINISTRATION

SELECTIVE SERVICE SYSTEM

GENERAL SERVICES ADMINISTRATION

DEFENSE MATERIALS PROCUREMENT AGENCY

RENEGOTIATION BOARD

This eight-page fold-out contains the names of key personnel in the defense organization

CHARLES E. WILSON

Director of Defense Mobilization

WHO'S

IN THE DEFENSE

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DEFENSE MO

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DIRECTOR: Charles E. Wi
INFORMATION
Andrew H. Berding, Ex
Scott Hershey, Ext.
Stanley Baits, Ext.

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New GAO Bldg STerling 5200

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Assistant Administrator, for Labor: Joseph Keenan, Ext 4471, Room 4A4

Deputy Administrator, and Chairman Aircraft Production Board: Harold R. Boyer, Ext 5937, Room 4A5

Deputy Administrator, for Program and Requirements: Ralph S Trigg, Ext. 5316, Room 4G7

Deputy Administrator, for Procurement & Production, and Chairman Production Executive Committee: Clay P Bedford, Ext 3106, Room 4A4

Assistant Administrator, to Coordinate Regional Defense Mobilization Committees: Eugene F Bertrand, Ext 3151, Room 4B6

Assistant Administrator, for Production Controls: W C Truppner, Ext. 4111, Room 3K2 Production Controls Systems Division Director Arthur U Sufrin, Ext 5107 Information on Production Controls: Bruce H McClure, Ext 4443, Room 4H4

Deputy Administrator, for Aluminum: Samuel W Anderson, Ext 5551, Room 2T2

Director, Conservation Division: Howard Coonley, Ext 3401, Room 4F1

Acting Deputy Administrator, for Resources Expansion: James F King, Ext 5246, Room 4N16

Electronics Production Board, Chairman: Edmund T Morris, Ext 3828, Room 4B6

Critical Areas Committee, Chairman: Ivan D Carson, Ext 3738, Room 4G2

Director of Information: Edward K Moss, Ext 4466, Room 3N1

NATIONAL PRODUCTION AUTHORITY

New GAO Building (unless otherwise noted)
STerling 5200

Administrator: Manly Fleischmann, Ext 4461, Room 3R2

Deputy Administrator: Henry H Fowler, Ext 4476, Room 3P2

General Counsel: John Alexander, Ext 4301, Room 3Y14

Director of Compliance: John Peckham, Ext 4393, Room 3R15

Assistant Administrator, for Labor: O. A Knight, Ext 3311, Room 3P2 **Deputy Assistant Administrator, for Labor**: Ted F Silvey, Ext 3311

Appeals Board Chairman: T Munford Boyd, Ext 3820, Room 5800B Commerce Bldg **Appeals Information Officer**: Morton A Reichek, Ext 4443, Room 4H4

Office of Industry Advisory Committees Director: G Lyle Belsley, Ext 5511, Room 4L1

Director of Public Information: Edward K Moss, Ext 4466, Room 3N1

Distribution Branch Chief (maintains the list of names to which NPA documents are mailed): E E Vivian, Ext 5793, First Basement, East

Office of Field Services, Director: Carlton Hayward, Ext 3641, 3890 Commerce Bldg

Business Advisory Center, Exts 5381-5, Room 2N6

NPA Metals & Minerals Bureau

(Has the responsibility for operating all metals divisions)

Assistant NPA Administrator for Metals &

NPA Iron & Steel Division

Director: Herbert Johnson, Sect 2H-8, Ext 4346

Deputy Director: J Douglas Darby, Sect 2H-10, Ext 3281-2

Assistant to the Director: Frank T McCue, Sect 2G-7, Ext 3962

Staff Assistant: Henry Leonard, Sect 2I-9, Ext 5948

Production Branch

Assistant Director for Production & Distribution: E D Bickford

Production Directive Committee Chairman: E D Bickford, Sect 2G-6, Ext 5747-8 **Vice Chairman**: Ross Wilkins, Sect 2F-7, Ext 3345

Production Control Section Chief: Charles Halcomb, Sect 2F-5, Ext 4637

Alloy Steel Section Chief: J J Boylan, Sect 2A-5, Ext 5705-6, **Assistant**: G J Carr, Sect 2A-5, Ext 5705-6

Bars & Semi-Finish Chief: J R Walker, Sect 2A-3, Ext 5011-2-3; **Assistant Chief**: G L Anderson, Sect 2A-3, Ext 5011-2-3, **Assistants**: D W Roberts, W E Blackburn, J W Roy, W A Kimble, John B Briggs

Castings Section Chief: A J McDonald, Sect 2D-6, Ext 5891, **Assistants**: F J Buckley, C W Oehler

Cold Finished Bar Section Chief: W A Thompson, Sect 2B-6, Ext 5849-3054; **Assistant**: H Nazarian

Sheet & Strip Section Chief: P H Pocock, Sect 2B-4, Ext 5991-2-3; **Assistants**: Milton Englert, Melvin Davis, H C O'Brian, John Mashmeyer

Rails & Track Accessories Section Chief: Ray Thulean, Sect 2D-2, Ext 4271; **Assistant**: R X McGowan

Stainless Steel Section Chief: Joseph P Butterfield, Sect 2B-6, Ext 4944-5—3603, **Assistants**: C Tamburello, C H Dorsey

Structural Shapes Section Chief: John J Bohnen, Sect 2F-3, Ext 4011-4010, **Assistants**: H E Ziegler, G R Bender

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Tool Steel Section Chief: Felix Kremp, Sect 2A-6, Ext 5916

Tube Section Chief: W J Resiner, Sect 2C-4, Ext 5439

Wire Section Chief: N F Melville, Sect 2B-6, Ext 3420-4656, **Assistant**: Edmond Burke

Forging Section Chief: J E Sweeney, Sect 2C-6, Ext 3004

Pipe Section Chief: Edwin A Booth, Sect 2D-4, Ext 4037-8, **Assistant**: A B Schoen

Plate Section Chief: Paul Landis, Sect 2D-4, Ext 4947-8-9, **Assistants**: G W Kirkley, D E Snowden, D S Wolcott

Program and Requirements Branch

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Requirements Section: Frank Green, Sect 2G-7, Ext 4515-4527

Regulations & Orders Section: G C Lovell, Sect 2G-7, Ext 4515-4527

CMP Processing Section: D Baum, Sect 2G-7, Ext 3339, J P Boquel

Export Section Chief: George V Bolger, Sect 2D-3, Ext 3765

Warehouse Section: Victor Prange, Sect 2B-7, Ext 3050-1; R N Carlen, Charles Kramer

International Section Chief: J J W Palmer, Sect 2H-3, Ext 3816

Ferro Alloys Branch

Assistant Director for Ferro Alloys: J H Critchett, Sect 2H-9, Ext 4795-3500

Ferro Alloys Branch Chief: F F Franklin, Sect 2L-8, Ext 3756-7, **Deputy Chief**: W G Johnson

NPA Industrial & Agricultural Equipment Bureau

(Responsible for operating all industrial and agricultural equipment divisions)

Assistant NPA Administrator for Industrial & Agricultural Equipment: Franz Stone, Ext. 3391, Room 3H16

Deputy Assistant Administrator: Frank Shields, Ext. 3391, Room 3H16

Information Officer: Robert Burkhardt, Ext. 4443, Room 4H4.

Agricultural Machinery & Implements Division, Room 3F7

Director: Frank Mussell, Ext. 5106

Deputy Director: John Ransome, Ext. 4922.

Tractor, Harvesting & Tillage Tools Branch Chief: Robert D. Merrill, Ext. 4480.

Dairy & Barnyard Branch Chief: James Crofoot, Ext. 4530.

Miscellaneous Farm Equipment Branch Chief: Robert Mueller, Ext. 4643.

Program & Requirements Branch Chief: Robert Terry, Ext. 3703.

Construction Machinery Division Room 3D6

Director: Myron B. Garber, Ext. 4196.

Deputy Director: Everett Wilcox, Ext. 4196.

Tractors & Tractor-Mounted Equipment Branch Chief: Ralph L. Schiesswohl, Ext. 4529.

Cranes & Shovels (except tractor-mounted) Branch Chief: D. J. Conway, Ext. 5054.

Motor Graders & Off-Highway Equipment Branch Chief: J. F. Sims, Ext. 4598.

Concrete, Bituminous & Miscellaneous Equipment Branch Chief: Bob Howe, Ext 5170.

Program & Requirements Branch Chief: Oren A. Prather, Ext. 5659.

Electrical Equipment Division Room 2N14

Director: Bonnell W. Clark, Ext 3256.

Deputy Director: Luther D. Shank, Ext. 3257.

Assistant to Director: H. E. Way, Ext. 3350.

Program & Requirements Branch Chief: C. G. Laslie, Ext. 3297.

Outside Distribution Branch Chief: D. A. Griffith, Ext. 3938.

Pole Line Equipment Section Chief: H Landsell, Ext. 4260. Assistant, T. A. Bonner, Ext. 4260.

Switchgear Section Chief: R. N. McCollom, Ext. 4280. Assistants, E. J. Norrett, Ext. 3120, and I. J. Kovach, Ext. 4406.

Transformer Section: L. H. Walke and G. W. Cooper, Ext. 3939.

Scheduling Engineer: E. M. McManus, Ext. 3939.

Motor & Control Branch Chief: S. H. Keller, Ext. 3947.

Industrial & Domestic Electric Section Chief: Jeb Darby, Ext. 4436.

Railroad Rectifier Battery Section Chief: E. D. Murray, Ext. 4452.

Motors and Generators Section Chief: R. L. Kingsland, Ext. 3095.

Expediting Section Chief: R. C. Wareham,

S WHO

ISE ORGANIZATION

OFFICE OF
E MOBILIZATION

Building EXecutive 3300

s E. Wilson, Ext. 2101, Room 102

IATION OFFICERS
ding, Ext. 471, Room 174½
ey, Ext. 494, Room 174½
ts, Ext. 2201, Room 173

Gages & Precision Measuring Instruments Section Chief: E. J. Masterson, Ext. 4803.
Welding Equipment Section Chief: William B. Browning, Ext. 4814.
Foundry Equipment & Supplies Section Chief: Francis E. Fisher, Ext. 4804.
Machine Tool Section Chief: Fred Crosby, Ext. 4827.
Machine Tool Forming Section Acting Chief: Paul W. Norris, Ext. 4827.
Industrial Heating Equipment Section Chief: Charles B. Kentnor Jr., Ext. 4813.
Wire Drawing & Rolling Mill Equipment Section Chief: Joseph G. FitzGerald, Ext. 3262.
Light Power-Driven Equipment Section Chief: Herbert A. Newman, Ext. 4802.
Machine Tool Attachment & Accessories Section Chief: Oscar Iber, Ext. 4802.
Tools, Dies, Jigs, Fixtures Section Chief: Jacob J. Demuth, Ext. 4801.
Subcontracting Facilities Section Chief: Robert M. Husband, Ext. 5909.
Pool Order Section Chief: Henry W. Armstrong, Ext. 5909.
Program & Requirements Branch Chief: James I. Shiels, Ext. 3978.
Used & Available Tools Section Chief: William S. McCormick, Ext. 4200.
Product Distribution Branch Chief: Howard L. Rich, Ext. 6961.
Production Liaison Section Chief: Joseph Willis, Ext. 4857.
Order Board Section Chief: E. Payson Blanchard, Ext. 4506.
Priorities & Distribution Section Chief: Harry F. Hawkins, Ext. 4370.
Diversion & Substitution Section Chief: Edgar Grossman, Ext. 4130.

Motor Vehicle Division
Room 3H10

Director: Courtney Johnston, Ext. 5495.
Deputy Director: Robert Cass, Ext. 3472.
Assistant to Director: Fred L. Glover, Ext. 5521.
Assistant to Director, and CMP Officer: George R. Davis, Ext. 3471.
Transit Vehicle Branch Chief: William J. Cummings, Ext. 3763.
Automobile Branch Chief: George R. Curtis, Ext. 3851.
Trailer Branch Chief: Elbert J. Lucas, Ext. 3751.
Truck Branch Chief: Raymond H. Fussell, Ext. 4161.
Engine Branch Chief: Thomas H. Stambaugh, Ext. 3689.
Replacement Parts Branch Chief: Lawrence Beerman, Ext. 5537.
Automotive Maintenance Equipment Branch Chief: Arthur R. Laney, Ext. 3868.
Priority Assistance & Tax Amortization Branch Chief: Marvin C. Clay, Ext. 5746.

Railroad Equipment Division
Room 3H12

Director: Guy O. Beale, Ext. 5184.
Deputy Director: Robert L. Glenn, Ext. 5184.
Locomotive Branch Chief: Mat R. Tate, Ext. 3913.
Rolling Stock Branch Chief: Stanley Brown, Ext. 4650.

tor: Robert de S. Couch, Ext. 3461, Room 2Q1.
Lumber & Wood Products Division Director: John M. Camp, Ext. 3707, Room 2R2.
Printing & Publishing Division Director: J. Noel Macy, Ext. 3295, Room 2P2.
Pulp, Paper & Paper Board Division Director: John W. Maloney, Ext. 4732, Room 2T1.
Rubber Division Director: E. D. Kelly, Ext. 3134.
Information Officer: John MacDonald, Ext. 4443, Room 4H4.

NPA Office of Civilian Requirements, Room 5001A Commerce Bldg.

Assistant NPA Administrator, for Civilian Requirements: Lewis Allen Weiss, Ext. 4617.
Deputy Assistant Administrator: Walter J. Currie, Ext. 4701.
Consumer End Products Division Director: Leslie P. Doidge, Ext. 4609.
Materials Division Director: Isaac Q. Lord, Ext. 4494.
Information Officer: Larry Beller, Ext. 4880.

NPA Office of Small Business, 3844 Commerce Bldg.

Acting Assistant NPA Administrator, for Small Business: James L. Kelly, Ext. 4670.
Assistant to Assistant Administrator: C. F. Hughitt, Ext. 5613, 1410 Tempo T. Bldg.
Materials & Equipment Assistance Division Acting Director: Philip A. Bennett, Ext. 4618, 1431 Tempo T Bldg.
Management Assistance Division Director: Wilford L. White, Ext. 4805, 1440 Tempo T Bldg.
Economic & Production Research Division Director: J. C. Dockeray, Ext. 4806, 1440 Tempo T Bldg.
Pooling Section Chief: Wendell O. Metcalf, Ext. 4615, 1323 Tempo T: Bldg.

ECONOMIC STABILIZATION AGENCY

Administrator: Roger L. Putnam, 811 Vermont Ave. N.W., Room 315, STerling 0167, Ext. 900.
Director of Information: Charles B. Holstein, 811 Vermont Ave. N.W., Room 307, STerling 0167, Ext. 976.

Wage Stabilization Board

Chairman: Nathan P. Feinsinger, 4062 Federal Security Bldg. South, REpublic 7500, Ext. 2231.
Executive Director: Harry Weiss, 4415 Federal Security Bldg. South, REpublic 7500, Ext. 2507.
Director of Information: Phillips J. Peck, 4316 Federal Security Bldg. South, REpublic 7500, Ext. 4267.

Salary Stabilization Board

Chairman: Justin Miller, 1042 Federal Security Bldg. South, REpublic 7500, Ext. 8405.
Executive Director: Joseph D. Cooper, 1042 Federal Security Bldg. South, REpublic 7500, Ext. 8215.
Director Industry Relations Staff: B. R. Mullady, 1077 Temporary R Bldg., REpublic 7500, Ext. 8141.
Director of Information: William Haggard, 2505 Temporary R Bldg., REpublic 7500, Ext. 8444.

Transportation Branch Acting Chief: Lester R. Conley, 2035 S, Ext. 3939.
Solid Fuels Branch Chief: William A. Fullarton, 2304 S, Ext. 4262.
Coke & Coal Chemical Section Chief: Jay D. Saylor, 2306 S, Ext. 3153.
Public Utilities Branch Chief: J. W. Lauderdale, 2203 S, Ext. 5600.

OPS Consumer Durable Goods Division

Director: Maitland L. Griggs, 2005 S, Ext. 5245.
Assistant Director: Lee McCanne, 2005 S, Ext. 5493.
Appliance & Equipment Branch Acting Chief: Miles E. Magargel, 2013 S, Ext. 4979.
Business Equipment Section Chief: William S. Miller, 2218 S, Ext. 4285.
Appliance Section Chief: Elwood R. Berkley, 2214 S, Ext. 8375.
Professional Goods Section Acting Chief: John F. Inderdohnen, 2224 S, Ext. 6279.
Stove Section Chief: Walter Kirby, 2220 S, Ext. 3686.
Home Furnishings Branch Acting Chief: Sterling B. McDonald, 2114 S, Ext. 4866.
Housewares & Accessories Branch Chief: J. Hepner Randolph Jr., 2118 S, Ext. 6637.

OPS Consumer Soft Goods Division

Director: Thomas L. Karsten, 2077 S, Ext. 4528.
Assistant Director: Sidney Shreero, 2071 S, Ext. 4510.

OPS Forest Products Division

Director: Rufus I. Worrell, 1003 S, Ext. 5653.

OPS Rubber, Chemicals & Drugs Division

Director: Thomas H. McCormack, 1003 S, Ext. 8065.

OPS Services, & Export-Import Division

Acting Director: Max L. Feinberg, 1047 S, Ext. 8541.
Export-Import Branch Acting Chief: Javior H. Cerecedo, 1047 S, Ext. 8541.
Export Section Chief: George McK. Roberts, 1402 S, Ext. 4709.
Imports Section Chief: Napoleon C. Guccione, 1402 S, Ext. 8556.

DEFENSE & ALLIED AGENCIES

DEFENSE DEPARTMENT

The Pentagon—Liberty 5-6700

Col. George W. White is chief of the Industrial Services Branch, Office of Public Information, Office of Secretary of Defense **organized to answer questions and clear requests of industry, and Jay Cas-**

Section. They are located in Room 2A858,

Minerals: Walter H Wiewel, Ext 3351, Room 2C1

Information Officers: Louis H Gerteis and Richard S Blaisdell, Ext 4443, Room 4H4

NPA Aluminum & Magnesium Division Room 2N1

Director: Timothy A Lynch Ext 5632

Deputy Director: Thomas N Peck Ext 5632

Assistant to Director: Herbert L Cullen, Ext 3971

Requirements & Distribution Branch Chief: Connor B Ratman, Ext 3778

Program & Statistics Branch Chief: S W Blumenreich, Ext 3597

Magnesium & Titanium Branch Chief: Perry D Helser, Ext 5520

Facilities & Construction Branch Chief: Henry M Scott, Ext 3610 Assistants: Bailey P Byars and J K Thompson, Ext 3610

Pig & Ingot Section Chief: Conrad Briel, Ext 4449 Metallurgical Uses of Aluminum John C West, Ext 4844

Warehouse Section Chief: Theodore E Boeger, Ext 6711

Sheet Section Chief: Robert T Farrel, Ext 6441

Castings Section Chief: Lloyd A Mapes, Ext 4718

Army Requirements Section Chief: Augustus Martin, Ext 5550

Navy Requirements Section Chief: Nicholas L Gross, Ext 5910

Air Force Requirements Section Chief: George F Mahoney, Ext 5036

Non-Military Government Requirements Section Chief: Robert E Heffernan, Ext 4776

Extrusion Section Chief: Edgar F Gore, Ext 5530 E W Digges LaTouche, Ext 4742

Commodity Industry Analysis: William E Fitch, Ext 5603, Thomas A Ritchie, Ext 4263

Consultant: Jacob B Neiman, Ext 5480.

NPA Copper Division Room 2H15

Director: Frank H Hayes, Ext 3318

Deputy Director: Paul B Andrews, Ext 3275 **Assistant to Deputy Director**: Lenox C Chew, Ext 3943

Wire Mill Branch Chief: Edward S Rising, Ext 5924 **Assistant Chief**: James H Crawford, Ext 5923 **Components & Technical Section Chief**: Daryl R DeRoche, Ext 5076 **Production & Facilities Section Chief**: Charles W Ange, Ext 5463 **Warehouse Section Chief**: William J Dwyer Ext 3968 **Program Section Chief**: J W Turner Ext 5922 **Allocation Section Chief**: Frank Spitale, Ext 4924

Brass Mill Branch Chief: David Marvel, Ext 4920 **Assistant Chief**: J V O'Conner Ext 3943 **Assistant to Assistant Chief**: Pembroke W Taylor, Ext 5403 **Production & Scheduling Section Chief**: William L Ashlock Ext 5973 **Facilities & Components Section Chief**: Edward B Blakely Ext 4926 **Technical Section Chief**: Herbert A Bedworth, Ext 5468 **Warehouse Section Chief**: Lenox C Chew, Ext 3943 **Allocations & Records Section Chief**: Lorin O Thompson, Ext 4925

Foundry Branch Chief: William A Meissner Jr Ext 3376 **Assistant Chief**: Julian Porter, Ext 5103 **Production, Facilities & Scheduling Section Chief**: Walter M Clark Ext 6044 **Allocation & Records Section Chief**: J Richard Varndell Ext 3970 **Technical Section Chief**: Harold B Gardner, Ext 5429 **Program Section Chief**: Dennis F O'Connor Ext 5469

Copper Raw Materials Branch Chief: Myron L Trilsch Ext 5404 **Scrap Section Chief**: C F Williams Ext 5069

Program & Requirements Branch Chief: William E Bradford Ext 4614 **Conservation Section Chief**: Lionel T Bonner Ext 4607 **Statistics & Reports Section Chief**: Glenn G Haycraft Ext 4724 **Orders & Regulations Section Chief**: Harry A Barron Ext 5497 **CMP & Program Section Chief**: James B Forman, Ext 4608

Navy Liaison: Lt Comdr G A Noerager, Ext 6033

3757

Tungsten: W D Crawford, Sect 2L-8, Ext 5009

Molybdenum: Harry Haas, Sect 2L-8, Ext 5007

Columbium: J B Edie, Sect 2L-8, Ext 3756

Manganese & Silicon: D H Duff, Jr, Sect 2L-8, Ext 4681-2

Cobalt & Titanium: E Mechlin, Sect 2L-8, Ext 3756-7

Requirements & Exports: P A Reinertson, Sect 2L-8, Ext 5007

Operations Section: G Kunkle, Sect 2L-7, Ext 3670, M J Dunbar, Sect 2L-7, Ext 3670, M J Dunbar

Nickel Section Chief: Harold Larson, Sect 2K-9, Ext 4681-2, **Assistants**: F R Bailey, W M Alston, J F Jackson, O Haughom

Pure Tungsten & Molybdenum Section Chief: H M Lusk, Sect 2L-9, Ext 4695-4960; **Assistant**: G C Wheeler

Metallurgical & Conservation Branch

Assistant Director for Metallurgy & Conservation: E J Hergenroether, Sect 2H-9, Ext 4868-3509.

Metallurgical & Conservation Branch Acting Chief: Veryl W Graze, Sect 2H-9, Ext 3607

Low Alloy Steels: E V Bennett, Sect 2H-9, Ext 3606, William J Brigham, Sect 2H-9, Ext 5548-44

Stainless & Super Alloy Steels: Gene Rowland, Sect 2H-9, Ext 5548-44, George A Sands John B Henry, Jr

Welding & Hard Facing: W J Lindner, Sect 2H-9, Ext 5548-44

Plating: Richard B Saltonstall, Sect 2H-9, Ext 3606

Nonferrous Alloys: Harry K Herschman, Sect 2H-9, Ext 5548-44.

Tool Steels: Michel Breyer, Sect 2H-9, Ext 5548-44

Facilities and Raw Materials Branch

Plant Facilities & Raw Materials Assistant Director: R J Wysor, Ext 3960-4731-5754

Special Assistants to Mr. Wysor: J L Hyland, Sect 2H-11, Ext 4731-5754, F H Crockard, Sect 2H-11, Ext 4731-5754, H W Bryant, Sect 2H-11, Ext 5244, W G Whitsitt Sect 2H-11, Ext 5245, E S Moorehead, Sect 2H-11, Ext 5245

Pig Iron Section Chief: J A Claussen, Sect 2M-10, Ext 3026-4002

Plant Facilities Section Chief: H L Leyda, Sect 2M-10, Ext 3934-5; **Assistants**: R E Curran, Sect 2M-10, Ext 3934-5; Homer F Ludwig, Sect 2M-11, Ext 3934-5

Scrap Section Chief: Marvin Plant, Sect 2M-10, Ext 3781-2-3, **Assistants**: Boyd Outman Sect 2M-10, Ext 3781-2-3, W H Smythe John P Voyer, Stuart Heiss

Refractories & Fluxes Section Chief: Mrs M M Sauers, Sect 2K-11, Ext 4017

MRO Section Chief: Frank A Weidman, Sect 2K-10, Ext 4939, **Assistants**: W O Rogers, J D Tierney

NPA Miscellaneous Metals & Minerals Division, Room 2I1

Director: Wm A White Sr, Ext 5361

Deputy Director: Harry B Sharpe, Ext 5361

Assistants: John E Steinhauer, Ext 3091; Mary E Lubig, Ext 5068.

NPA Tin, Lead & Zinc Division Room 2E1

Director: Erwin Vogelsang, Ext 4501

Deputy Director: John Sellon, Ext 5363

Tin: W L Raup Jr, Ext 3166; Arthur Fritschle Ext 3167

Zinc: Herbert O Rogers, Ext 3198

Zinc & Cadmium: Mrs Margaret Murphy, Ext 3015

Lead: James Owen, Ext 3930; Arthur Cavanaugh, Ext 3930

Bismuth: M E Parkinson, Ext 3370

NPA Salvage Division Room 2B4

Director: Edward W Greb, Ext 4917.

Promotion Director: Edward F Mulligan, Ext 3284.

Ext 3095.

Lighting & Interior Distribution Section Chief: W H Kennedy, Ext 5657.

Wiring Device Section: L Alan Sharp and Thomas E Cornell, Ext 4117.

Lighting Equipment Section: J H Brundage, Ext 6938; Hugh Estes, Ext 4138, John N Payne, Ext 6738.

Interior Distribution Section Chief: E S Milligan, Ext 5657.

Engine & Turbine Division Room 2-O-14

Director: Otis Howard, Ext 4202.

Deputy Director: E J Hand, Ext 4202.

Steam Turbine Section Chief: P J Robinson, Ext 3937.

Boiler Section Chief: Frank X Gilg, Ext 4888.

Condenser Section Chief: M J Kilroy, Ext 4707.

Hydraulic Turbine Section Chief: Oscar A Arnold, Ext 4810.

Internal Combustion Engine Section Chief: R N Tate, Ext 4811.

Water Softener Section Chief: E H Aldworth, Ext 3310.

Heavy Metal Tanks & Pressure Vessels Section Acting Chief: George Conners, Ext 3326.

Fabricated Pipe Section Chief: John Kelly, Ext 3946.

Coordination Branch Chief: E P Welch.

Program & Statistics Branch Chief: George Roewe, Ext 3945.

General Components Division Room 3A7

Director: Arthur J Kerr, Ext 5141.

Deputy Director: James P Baldwin, Ext 5141.

Assistant Director: Lindsay C Howell, Ext 5141.

Formed & Machined Products Branch Chief: Raymond C Waterman, Ext 4029. (Bolts, nuts, screws, washers, screw machine products, springs, stampings, etc.)

Antifriction Bearings Branch Chief: Charles D Addams, Ext 4045.

Valves & Fittings Branch Chief: John String, Ext 4850. (Valves, pipe fittings, hose fittings, gaskets, packing, etc.)

Industrial Specialties Branch Chief: Lloyd R Clowes, Ext 4837. (Chain, marine supplies, chain fittings, wire cloth, casters and wheels.)

Mechanical Power Transmission Branch Chief: Clarence R Burrell, Ext 4877. (Sprocket chain, conveyer chain, gears, pulleys, clutches, couplings, belt lacing, shafting, sleeve bearings, etc.)

Tools Branch Chief: A N Berbatis, Ext 4847. (Saws, files, vises, wrenches, pliers, agricultural hand tools, railroad maintenance tools, mechanical hand tools, etc.)

Program & Requirements Branch Chief: Harry S Mills, Ext 3676.

General Industrial Equipment Division, Room 3D7

Director: Wesley S Walker, Ext 5466.

Deputy Director: William L Beck, Ext 4874.

Materials Handling Equipment Branch Acting Chief: Joe H Peritz, Ext 3860.

Special Industrial Equipment Branch Acting Chief: James A Lawson, Ext 5609. (chemical, printing, woodworking, pulp and paper machinery mainly.)

General Service Equipment Branch Acting Chief: James W Anderson, Ext 5703. (Pumps, compressors, fans, dust collectors, industrial refrigeration machinery, etc.)

Program & Requirements Branch Acting Chief: Robert K Oakley, Ext 4613.

Food, Fiber & Fats Processing Equipment Branch Acting Chief: Roy C Hartwell, Ext 5704.

Metalworking Equipment Division Room 3H14

Director: Swan E Bergstrom, Ext 4687.

Assistant to Director: Thomas R Rudel, Ext 5856.

Forge & Press Equipment Section Chief: Howard A Carlisle, Ext 4827.

Materials & Components Section Chief: Joseph G FitzGerald, Ext 3262.

Abrasive Products Section Chief: Ralph O Anderson, Ext 4779.

Cutting Tool Section Chief: Wiley T Buchanan, Ext 5285.

Section
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Transit Branch Chief: David R. Depue, Ext. 4755.
Maintenance of Way and MRO Branch Chief: George Sitten, Ext. 3024.
CMP Branch Chief: Lewis Malcolm, Ext. 3470. **Assistant Chief for CMP:** Albert J. Wolken, Ext. 4679.

Mining Equipment Division Room 3E7

Director: H. A. Montag, Ext. 5017.
Deputy Director: L. M. Case, Ext. 5018.
Rock Machinery Branch Acting Chief: Paul R. Moyer, Ext. 4430.
Coal Machinery Branch Acting Chief: Glen R. Parker, Ext. 4470.
CMP Section Chief: O. J. LaBell, Ext. 4320.

NPA Textile, Leather & Specialty Equipment Bureau

Assistant NPA Administrator: Horace B. McCoy, Ext. 3421, Room 3840 Commerce Bldg.
Deputy Assistant Administrator: Richard W. Murphy, Ext. 3458, Room 3844 Commerce Bldg.
Information Officer: Virgil R. Hassler, 4H4 New GAO Bldg., Ext. 4443.
Aircraft Division Director: Joseph J. Mitchener, Ext. 5813, Room 1305 Tempo T. Bldg.
Communication Equipment Division Director: Robert E. Williams, Ext. 4128, Fifth Floor 801 E. N. W.
Consumers Durable Goods Division Director: H. J. Holbrook, Ext. 4761, Fourth Floor 801 E. N. W.
Electronics Division Director: Edmund T. Morris, Ext. 3585, Room 2358 Tempo T. Bldg.
Leather & Leather Products Division Director: Julius Schnitzer, Ext. 3639, Room 2131 Tempo T. Bldg.
Motion-Picture-Photographic Products Division Director: Nathan D. Golden, Ext. 3171, Room 5806 Commerce Bldg.
Ordnance & Shipbuilding Division Acting Director: Arthur C. Rohn, Ext. 5231, Room 2305 Tempo T Bldg.
Scientific and Technical Equipment Division Director: Howard A. Pringle, Ext. 5904, Room 2258 Tempo T Bldg.
Service Equipment Division Director: Cameron B. Lynham, Ext. 5892, Room 2150 Tempo T Bldg.
Textile Division Director: A. Henry Thurston, Ext. 4097, Room 2007, Tempo T. Bldg.
Water Resources Division Director: Gerald E. Arnold, Ext. 4964, Room 1405, Tempo T Bldg.

NPA Facilities & Construction Bureau

Pension Office Bldg. (formerly Old GAO Bldg.)
Assistant NPA Administrator: Frank R. Creedon, Ext. 5151.
Assistant to Assistant Administrator: William R. Davlin, Ext. 5431.
Building Materials Division Director: John L. Haynes, Ext. 3803; **Deputy Director:** Charles P. Redick, Ext. 4072, Room 325 Old GAO Bldg.
Construction Controls Division Director: Rufe B. Newman, Ext. 3412. **Deputy Director:** Stephen Burns, Ext. 4012.
Industrial Expansion Division Director: William E. O'Brien, Ext. 5545. **Deputy Director:** George E. Meyer, Ext. 4310.
Loan Division Director: Harvey M. Harper, Ext. 3558. **Assistant to Director:** Carl Scheid, Ext. 4593.
Tax Amortization Division Director: Ross A. Gridley, Ext. 5587. **Deputy Director:** Jacob Friedman, Ext. 5588.
Information Officer: William J. Digges, Ext. 4443.

NPA Chemical, Rubber & Forest Products Bureau

Assistant NPA Administrator: Kenneth H. Klipstein, Ext. 4241, Room 2Y1.
Deputy Assistant Administrator: Lawrence W. Strattner, Ext. 4893, Room 2Y1.
Chemical Division Director: Osgood V. Tracy, Ext. 3112, Room 2Z15. **Aromatic & Coal Tar Chemicals Branch Chief:** L. A. Schlueter, Ext. 5033.
Containers and Packaging Division Direc-

Office of Price Stabilization

Temporary E and S Bldgs. STerling 4200
Director: Michael V. DiSalle, H-383 E. Ext. 3215.
Executive Assistant: Thomas Klechak, S-309 E. Ext. 4318.
Chief Counsel: Harold Leventhal, S-318 E. Ext. 2594.
Director, Office of Price Operations: Edward F. Phelps Jr., S-204 E. Ext. 2568.
Trade Press & Trade Association Information Acting Chief: Walter J. McDonald, 7-104 E. Ext. 5518-9.

OPS Industrial Materials & Manufactured Goods Division

Director: Murray D. Smith, 2067 S. Ext. 3132.
Assistant Director: John M. Bulkley, 2067 S. Ext. 3133.
Assistant Director: Sam Ewing, 2059 S. Ext. 4989.
Administrative Officer: W. F. Hagan, 1053 S. Ext. 6273.
Information Officer: Lester S. Scott, 7-103 E. Ext. 3491.
Division Counsel: F. Stewart Strannahan, 2053 S. Ext. 4484.
Metals Branch Chief: William Kerber, 2503 S. Ext. 5108.
Iron & Steel Products Section: Fred Youngman, 2507 S. Ext. 4610.
Copper & Brass Section Chief: A. F. Norling, 2513 S. Ext. 8095.
Lead, Tin & Zinc Section Chief: C. C. Rieth, 2505 S. Ext. 8446.
Castings & Forgings Section Chief: E. J. Metzger, 2511 S. Ext. 5228.
Light Metals Section Chief: W. N. White Jr., 2519 S. Ext. 3236.
Scrap Iron & Steel Section Chief: David C. Holub, 2521 S. Ext. 8236.
Miscellaneous Metals & Minerals Section Chief: J. C. Twinem, 2517 S. Ext. 8892.
Fabricated Products Section Chief: H. H. Needham, 2509 S. Ext. 4395.
Machinery Branch Chief: L. J. Carson, 2526 S. Ext. 6534.
Auxiliary Machinery Section Chief: W. B. Leland, 2506 S. Ext. 8887.
Construction, Mining & Quarrying Machinery Section Chief: A. E. Loder, 2518 S. Ext. 8880.
Cutting Tools & Industrial Supplies Section Chief: E. L. Norman, 2510 S. Ext. 8976.
Electrical Machinery & Power Equipment Section Chief: H. M. Jalonack, 2520 S. Ext. 8889.
Farm Machinery & Equipment Section Chief: A. A. Stone, 2504 S. Ext. 2291.
General Industries Machinery Section Chief: W. F. Earls, 2524 S. Ext. 5533.
Metals Extraction & Fabricating Machinery Section Acting Chief: A. M. Sheard, 2516 S. Ext. 8886.
Transportation, Materials Handling & Instrument Section Chief: L. W. Wallace, 2514 S. Ext. 3519.
Automotive Branch Chief: W. L. Jordan, 1052 S. Ext. 8884.
Passenger Car Section Chief: K. A. Metzerott, 1401 S. Ext. 8879.
Building Materials Branch Chief: W. H. Acheson, 2536 S. Ext. 3502.
Roofing & Insulation Section Acting Chief: Donald Linville, 2538 S. Ext. 3119.
Masonry Materials Section: Wm. Pringle, 2536 S. Ext. 8978.
Hardware & Miscellaneous Products Section Chief: Henry Bryson, 2536 S. Ext. 8355.
Mechanical Building Equipment Section Acting Chief: R. C. Cook, 2536 S, Ext. 3118.
Construction & Distribution Section Chief: T. C. Letchworth, 2540 S, Ext. 8026.

OPS Food & Restaurant Division

Acting Director: George L. Mehren, 1071 S. Ext. 6242.
Assistant Directors: Arval L. Erikson, 1075 S. Ext. 6244; Francis C. Jones, 1069 S. Ext. 8386.

OPS Transportation, Public Utilities & Fuels Division

Director: G. Storer Baldwin, 2027 S. Ext. 4244.
Petroleum Branch Chief: Loring T. Cramer, 2323 S. Ext. 8251.

Section. They are located in Room 2A858, The Pentagon. Extension for Col White is 75881, for Mr. Cassino 75310.

Those wishing to contact personnel in the Munitions Board (the military policy coordinating agency) should see or telephone or write to the Public Relations Adviser to the Munitions Board, **Col. William Westlake,** 3E843 The Pentagon, Ext. 75361.

Small businessmen with problems that require help from the military should see, write or telephone the chief, Small Business Office, Munitions Board, who is **Richard Lennihan,** Room 3E783, The Pentagon, Ext. 76907.

For assistance in matters relating to procurement see the Central Military Procurement Information Office, Room 3D754, The Pentagon, Ext. 66151.

DEFENSE MANPOWER ADMINISTRATION

Labor Department Bldg.
EXecutive 2420
Administrator: Frank P. Graham, Ext. 17.
Executive Director: Robert C. Goodwin, Ext. 780.
Deputy Director: Leo Wertz, Ext. 215.

SMALL DEFENSE PLANTS ADMINISTRATION

1337 E. Street N.W. STerling 2858
Administrator: Telford Taylor, Ext. 2271.
Director of Information: Albert J. Lubin, Ext. 3256.

SELECTIVE SERVICE SYSTEM

1712 G Street, N.W. REpublic 5500
Director: Maj. Gen. Lewis B. Hershey, Room 516, Ext. 3501.
Chief Information Officer: Lt. Col. Irving W. Hart, Room 509, Ext. 3675.

GENERAL SERVICES ADMINISTRATION

GSA Bldg. EXecutive 4900
Administrator: Jess Larson, Ext. 4312, Room 6137.
Assistant Administrator (for metals and minerals expansion programs under the Defense Production Act): Irving Gumbel, Ext. 5181, Room 6110.
Commissioner of Emergency Procurement Service (for stockpiling): A. J. Walsh, REpublic 7500, Ext. 2243, Room 7132 (Seventh and D streets S.W.).
Commissioner of Federal Supply Service: Clifton E. Mack, Ext. 5268, Room 3143.
Director of Information: Herbert C. Plummer, Ext. 4511, Room 6113.

DEFENSE MATERIALS PROCUREMENT AGENCY

GSA Bldg. EXecutive 4900
Administrator: Jess Larson, Ext. 4312, Room 6137.
Deputy Administrator: Howard I. Young, Ext. 4131, Room 7137.
Domestic Expansion Division Director: James Douglas, Ext. 6137.
Program Development Division Director: Tom Lyon, Ext. 6137.
Claimant & Allocations Division Director: Harold Montag, Ext. 6137.
Foreign Expansion Division Director: Charles E. Stott, Ext. 6137.
Information Officer: Herbert C. Plummer, Ext. 4511, Room 6113.

RENEGOTIATION BOARD

GSA Bldg. at Seventh and D streets S.W. REpublic 7500
Chairman: John T. Koehler, Ext. 71251.

COMPILED BY
TEEL
JANUARY 7, 1952

DEFENSE SUPPORTING AGENCIES

DEFENSE SOLID FUELS ADMINISTRATION

Interior Bldg REpublic 1820

Administrator: Charles W Connor, Room 5312, Ext 5225

Deputy Administrator: Edward T Klett, Room 5316, Ext 5210

Deputy Administrator: W F Hahman, Room 5312, Ext 5391

Deputy Administrator: Charles R Ferguson, Room 5320, Ext 5211

Director of Information: Andrew L Newman, Room 5315, Ext 5064

Joint Committee on Mining Machinery & Equipment Chairman: Clem C Austin, Room 5210, Ext 2485

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(Government agency for making available to the public technical information developed by the government)

Director: John C Green, Room 1313, Ext 2143

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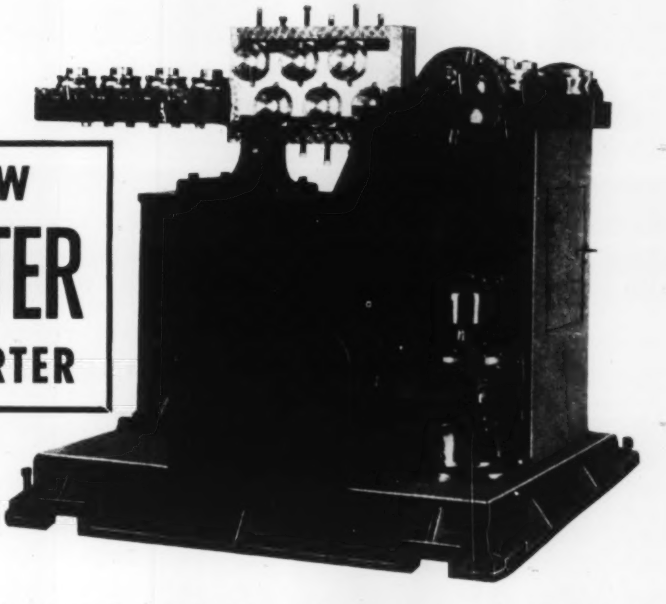

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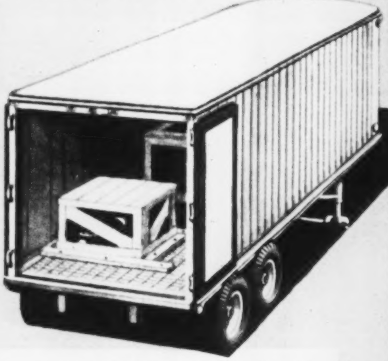

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By H. C. TUTTLE *Detroit Editor*

Mirrors of Motordom

In its 52nd year the auto industry—one of the most important single factors in our economic development—will be a monument to our guns-butter dichotomy, supplying arms for defense and mobility for a nation

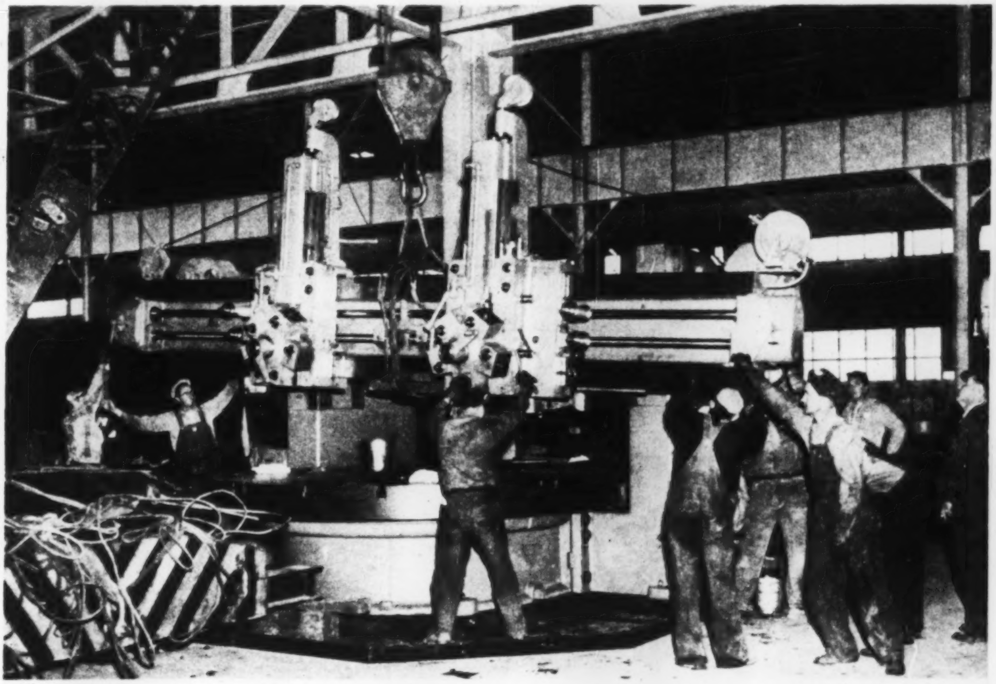
THIS YEAR the automakers—on a scale not duplicated by any others—will demonstrate what it means to produce for a garrison-state economy. As 1952 began they had more than $6 billion worth of military contracts. Before the year is out their orders will have passed through the tooling-up stage and deliveries will begin. All the while they will be producing their own products—the automobiles that few Americans can do without.

Make no mistake about it: The guns-and-butter dichotomy of our present economy was tough on the auto industry. It's going to continue to be so. A guns-and-butter argument will pop up every time a decision must be made as to which one should take precedence.

Automobiles, despite their luxurious appointments and ultra-fancy trim, are sold in the last analysis to give mobility. There are few factors that rank more important in the nation's growth and development than the automobile. But its significance has become so well established as to be easily overlooked.

Pause for Reflection—A look at what the industry's products did in 1951 is again in order. Registrations for the first time exceeded the 50-million mark. An estimated total of 42,846,000 passenger cars and 9,390,000 trucks and busses were in use at yearend. That was a net gain of more than 3 million vehicles over 1950. In gasoline consumption, miles traveled, and special taxes paid, new records were also established. Motorists traveled 485 billion miles last year, consuming 37.5 billion gallons of fuel. In one way or another they paid $4,470 million in special taxes. Trucks alone accounted for $1.3 billion of the year's tax levies.

The well-publicized reduction in manufacturers' production nicked a 15 per cent chunk out of their previous year's output. In 1951, estimates the Automobile Manufac-



DREAM COME TRUE: Machine tools needed for production of medium and heavy tanks are being installed in Chrysler's tank plant at Newark, Del., as quickly as the roof goes on the new facility. This 20-inch vertical boring mill, used for machining the turret ring, was installed in one day and in operation the next. Only a dream last year, the plant is 60 per cent complete. This is typical of the auto industry's large-scale conversion to defense work

CIVILIAN CLOTHING: *Mute testimony to the curtailment of civilian production are these special purpose machine tools and dies shrouded and stored in Chevrolet-Toledo's yard. They were replaced in the plant with equipment needed for production of transfer cases for 6 by 6 military trucks*

turers Association, combined output of cars, trucks and busses was 6,806,000 units. Compare that with the record achievement of 1950 when 8,003,045 vehicles were produced. Passenger cars rode along fairly smoothly through the first six months of 1951, but the progressively sharper restrictions on materials in the last half brought output to 20 per cent under 1950. The 5,373,000 cars turned out last year compares with 6,665,863 built in record-breaking 1950. Truck and bus production at 1,433,000—including a substantial number of military vehicles—topped the previous year's outturn by 100,000 units.

Scrap Pile—More old cars wound up in wreckers' yards last year than in any previous 12-month period. Estimates are that more than 3 million units were junked. Wrecking subtracted half a year from the passenger car's average age. It went from 7.8 years in 1950 to 7.3 years by the end of 1951. Almost one-third of the vehicles in use (in the case of passenger cars, 18 million) are over ten years old, so a fair assumption is the number of vehicle registrations will increase only slightly the coming year.

Wholesale value of motor vehicles sold last year declined from 1950's record $10,380,700,000 to $9,553,000,000. But replacement parts wholesale value rose to $2.5 billion as compared with $2.1 billion in 1950.

No. 100,000,000—In the middle of last month an unheralded event was a fitting climax to the industry's first 51 years. From one of the industry's 112 assembly plants, scattered in 25 states, the 100 millionth passenger car rolled. From 1900 when 4192 cars were built it took until 1912 to produce the first million. Thirteen years later the 25 millionth came out. By 1935 the 50 millionth had been produced, and in 1946 No. 75,000,000 came off a line. Thus in five years 1947-1951 the last 25 million were produced.

In this same span of years employment in the industry rose from 2200 production workers in 1900 to over 700,000 now. More than 8 million jobs were created by the distribution and use of cars. One in every six businesses in the nation is devoted primarily to automotive - parts making, servicing, and selling.

One-fifth of the retail sales volume of this nation is classed as automotive.

Above the Optimists—Small wonder it is that anything affecting the industry causes repercussions up and down the line. The industry last year turned out more vehicles than even the most optimistic observers believed it would. It had been presumed just a year ago that by this time much of the transitional unemployment would have passed and the tool-up for military production would be well in hand. Few people suspected that the industry would not accomplish the conversion in much the same way they had in World War II.

And fewer still dreamed that new plants of monumental proportions would be required to permit superimposing a defense industry on top of a higher-than-normal civilian output.

Unemployment Grows—Fears of high unemployment in auto plants were first regarded as unfounded, later as premature, but as the year ended the problem was real and bordered on the acute. By most automakers, the surplus of labor was regarded as a temporary situation, and in skilled categories such as tool and die makers and specialized machine operators there already was a shortage. But for the rank-and-file production worker a lay-off of indeterminate duration was looming. Gravity of the situation was pointed out time and again by the United Autoworker's president Walter Reuther.

Junior Senator Blair Moody of bringing to Defense Mobilizer Wilson's attention the serious outlook. Immediately following the opening of Congress' 1952 session, about 800 UAW local union presidents from nearly every state will hold a conference with government officials in Washington to impress upon it the need for action in several directions.

Theme and Variations—The union's six-point program, serving as the theme of the conference, consists of these proposals: 1. Present civilian production schedules be maintained until defense work progresses to the point where it will take up the slack. 2. Federal funds be used to supplement state unemployment compensation to provide 40 hours' pay a week to workers laid off because of mobilization policies. 3. Defense work be channeled into civilian plants to achieve maximum utilization of unused productive capacity and minimize need for new plant construction. 4. Initiation of a civilian

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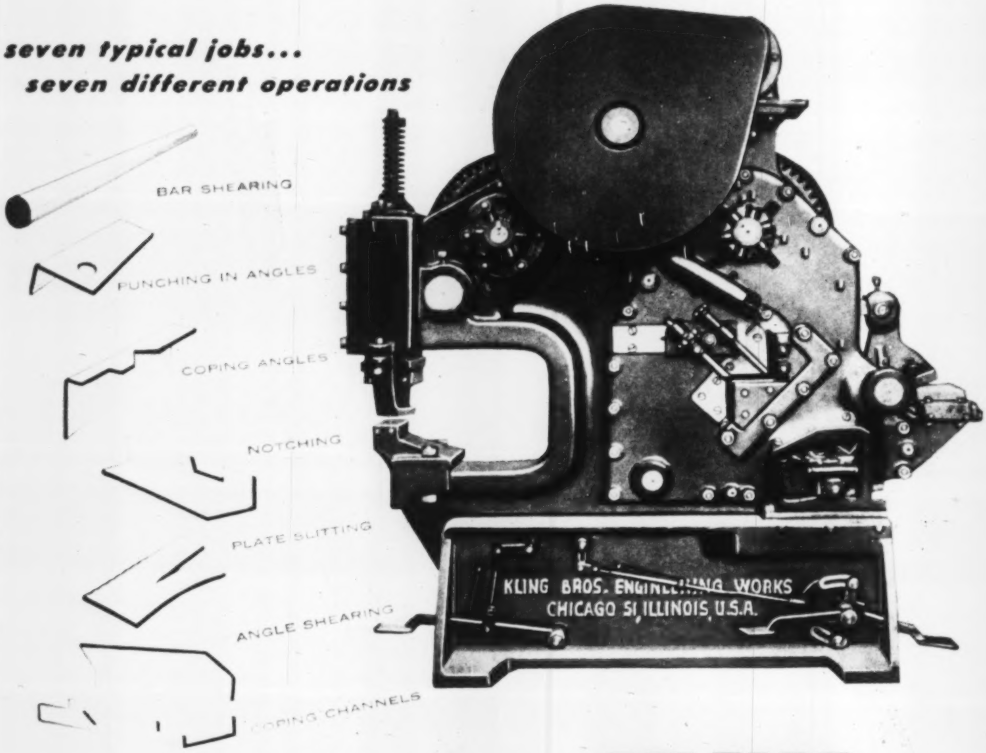
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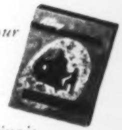

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scrap drive. 5. Establishment of a "technical task force" to co-ordinate and help steer the program for finding substitutes for copper and other critically scarce materials. 6. More contracts and subcontracts be placed with auto, truck and agricultural implement builders and other civilian metalworking industries for production of machine tools.

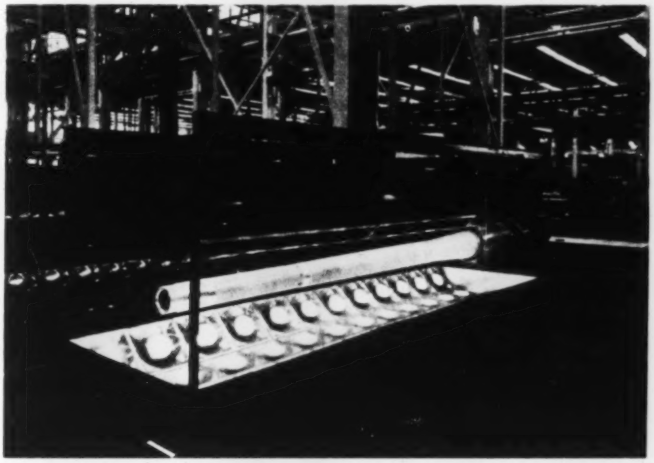
Whatever action is taken in regard to any of these six proposals, they serve to illustrate one of the most significant developments of the past year. That is the relocation of decision-making governing the automaking industry, in fact all industry. On price, labor, materials, and wages the all-important decisions are made in Washington—often in direct contradiction to those that industry recommends.

Expectation, Indication—No one expects the auto industry to be permitted this year to make in excess of 4 million passenger cars. There are indications that 3.5 million might turn out to be an optimistic ceiling. Second quarter's quota was the subject of much trial-ballooning by NPA to discover how low the ceiling can be moved without squashing part of the industry. One auto maker believes a quarterly quota of 600,000 cars for the industry would have all in a serious financial condition, would deprive the government of tax receipts and knock one of the strongest props from under the economy.

It was General Motors' C. E. Wilson who last year proposed adoption of a new concept in industrial plant construction and operation. His idea (it's being put into practice in isolated cases in new GM plants) is for triple-duty plants—either purely civilian, joint military-civilian, or purely military. Plants of single-purpose nature, he believes, cause worker dislocation, time and production loss when they are retooled for a different product.

"Fill Up Texas"—The little-understood fact about many of the single-purpose military plants now being erected by automakers is that they will produce, barring all-out war, only a small fraction (in some cases only 10 per cent) of their capabilities. If they were to operate full-tilt with no use being made of their product except a stockpile they could, says one auto maker, soon "fill up Texas."

Nevertheless to bring the military production potential up to a safe level and in recognition of the danger at any time of all-out war with no warning, the auto industry embarked last year on a construction program almost beyond comprehension. Some of the largest: Chrysler's, Newark, Del., tank plant; Buick's, Flint, Mich., and Willow Springs, Ill., J-65 jet engine plants; Chrysler's, Detroit, J-48 jet engine plant (Navy-owned); Ford's, Livonia, Mich., tank plant; Packard's, Utica, Mich., J-47 jet engine plant; Pontiac's, Pontiac, Mich., amphibious cargo carrier plant; Ford's, Claycomo, Mo., B-47 wing section plant; Chevrolet's, Flint, Mich., and Tonawanda, N. Y., Wright reciprocating engine plants.



'ROUND SHE GOES: Oldsmobile's gun plant at Lansing, Mich., is turning out 90-millimeter tank cannon for Army Ordnance. The 15-foot tube, its protective paint being dried under infra-red lamps, weighs more than a ton when received as a forging. A finished gun—tube, breech block and breech ring—goes from this plant to one of the soon-to-be numerous tank assembly points

Biggest Ever — In several cases initial contracts for military items were the largest the companies had ever received. All listed plants contain at least 500,000 square feet of floor space; many are in excess of 1 million square feet. And many plants of smaller size were built in the past year or now are abuilding. Some very large properties were reactivated.

The Michaud Ordnance Plant in New Orleans where Chrysler will build tank engines, the Tonawanda, N. Y., government-owned plant taken over by Chevrolet, the St. Louis shell-loading plant operated by Chevrolet, the aircraft engine plant that Studebaker will run and the giant ex-Tucker plant in Chicago in Ford's hands are examples. Then there are the numerous cases of plants in which both civilian and military work are side by side: The Evansville, Ind., plant where Grumman hulls are made along with Plymouth cars, Willow Run where Kaisers and Henry Js are sharing space with C-119 Packets. Hudson and Packard are using and expanding manufacturing facilities to accommodate their defense orders. Willys-Overland, heavily in defense work throughout the postwar period, uses the side-by-side technique in many of its operations. Nash will be building aircraft engines in existing plants.

A Story in Each — Each new plant or plant conversion is a story in itself. A typical one is the jet engine subassembly plant being built by Buick outside of Flint. The largest of Buick's defense plants, it will cover 1,667,500 square feet. To level the ground for it required movement of over 1 million cubic yards of dirt at a cost estimated at more than $1 million.

For their part, the automakers have been almost too successful from a public standpoint in coping with the problems of the last year. There is no indication given by the 1952 models that "austerity" is being practiced. Nickel plating, except for functional parts, gave way almost unnoticed to other bright finishes. Stainless steels — more accurately described as "chrome iron" — make up the bulk of the exterior bright work. Though not as brilliant they still heighten the feeling that today's automobile is at least as glamorous as its pre-Korea cousin. After some unhappy excursion into painted steel radiator tanks last year, automakers found they could reduce their copper consumption around 20 per cent without materially affecting the life of products. They are learning, too, that they have been prodigal in the use of other materials.

Materials Alternate — The past year has seen specifications change time and again as the boron steels were substituted for alloys, cast iron for aluminum, plastics for zinc die castings and metal stampings. But at no time did a new product take on an "ersatz" appearance. And the automakers will earnestly tell you that the new is better than the old in nearly every particular.

As to critical materials, copper gives automakers their worst time. As the year begins it will be *the* limiting material to output. Experimental radiators of aluminum are being tried by nearly all makers. Many are experimenting with copper-clad steel for radiator tanks. The possibility of copper plating also attracts attention. None of the experiments, though, worked out to the satisfaction of all companies. Each is resentful of any government man telling them what substitute they should use. Until the radiator problem is solved and until a practical method of joining terminals to aluminum wiring harnesses is devised, copper in substantial quantity will be required by the industry. If and when these hurdles are overcome, the industry believes it will be able to make a sufficiently good case to win much higher steel and aluminum allotments than it presently gets.

The trend toward higher compression engines in cars was slowed last year by the lowering of octane ratings of gasolines. Some spectacular progress was made by Chrysler divisions in building "mechanical octanes" into their new engines, thus enabling them to use regular-grade gas and get high performance results. Notwithstanding this stumbling block most of the new cars have higher ratios and higher horsepower ratings.

New Perspective — Spurred by the government handling of materials allotments and a certain flexibility in the use of these to get maximum unit production, the light car has become more attractive than ever before. The successful public reception of the Henry J and Nash Rambler caused a re-examination of the often-calculated costs of such automobiles. Willys-Overland, out of the conventional passenger car business since before the war, re-enters it this month with a slightly below normal size car. Hudson disclosed plans to introduce this summer a light car of higher power than those presently in the light-car category and embodying "step-down" frameless construction.

Hard Wallops — Although many automotive supplier companies have prime or subcontracts (automakers are maintaining their policy of acting primarily as assemblers) bleakest outlook in the coming year is for those companies. They felt the drastically curtailed rate of civilian automotive production hardest in the closing months of 1951. Defense work in most cases was not requiring deliveries of components in anything like the quantities necessary to make up the civilian drop. Few think 1952 will be better.

Shades of '46? — Last year saw consumers holding on to their money in a surprising fashion. Automobile sales managers and dealers were baffled time after time by a demand that failed to meet expectations. But assessing next year's limited production and a decreasing backlog of field stocks, there is no question in their minds that after a few months—possibly six—of highly competitive selling, the industry will have a demand on it much greater than its ability to satisfy. For many observers a repetition of the 1946 waiting lists is regarded as distinctly possible.

TIGHT SQUEEZE: First of the C-119 Fairchild Packets being produced by Kaiser-Frazer at Willow Run nears completion. Auto manufacture at this plant was compressed so the aircraft program could be fitted into the existing building. Later this year Fairchild will have expanded its output enough so K-F can manufacture the Chase C-123 assault transport on this production line

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SHARONSTEEL

NEW LOCK NO. 2, MONONGAHELA RIVER. First ship through on June 1, 1951 was U. S. Steel's "Homestead." A special feature of the lock is an emergency dam, at the upstream end, which can be raised or lowered as needed.

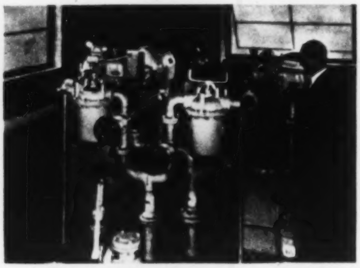
ENGINEERS PICK SUN HYDRAULIC OIL FOR NEW LOCK ON MONONGAHELA

Last year the Monongahela, busy river that flows past Pittsburgh's Golden Triangle, carried 2,000,000 more tons of shipping than the Panama Canal. This year its tonnage promises to be higher still, for on June 1 the U.S. Army Corps of Engineers put in operation their new Lock No. 2, near Braddock.

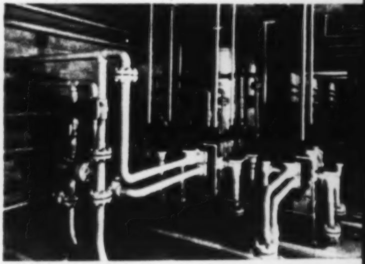
The entire mechanism of this lock . . . gates, butterfly valves, and capstans . . . operates hydraulically, and a Sun Hydraulic Oil was chosen as the medium. Why? Because this vital job required an oil that would prevent corrosion and rust; that would retain its original specifications for the life of the equipment; and that would flow freely at low temperatures, yet not thin out at high. The engineers in charge chose a Sun Hydraulic Oil over all other oils because they felt it could be best counted on to keep the lock in operation and river traffic moving.

For complete information on Sun Hydraulic Oils and recommendations as to their use in your operations, write for booklet S-1.

HYDRAULIC CAPSTANS, operated by Sun Hydraulic Oil, are used when tows, too long for the locks, have to be broken up into units and pulled through mechanically.



SYSTEM'S HEART, operating the lock mechanisms, is a pair of Oilgear hydraulic pumps. They supply 2,300 gallons of Sun Hydraulic Oil at pressures up to 1,100 psi.



UNDERGROUND SYSTEM of pipe lines supplies all hydraulic devices. It is designed so that it will continue to function even though the chamber is completely flooded.

SUN INDUSTRIAL PRODUCTS

SUN OIL COMPANY, PHILADELPHIA 3, PA. • SUN OIL COMPANY, LTD., TORONTO AND MONTREAL

SUNOCO ®

Men of Industry

Charles B. Cushwa Jr. was elected president of **Commercial Shearing & Stamping Co.,** Youngstown, to succeed his late father, **Charles B. Cushwa. Herbert B. Wollison,** vice president of the subsidiary, Commercial Shearing & Stamping Inc., the company's Chicago operation, was elected vice president of the parent company as well, and also was elected to the board of directors of both companies. **Ivory C. Jones,** comptroller of the parent company, was also elected secretary, and **Wilbur J. Clarke** becomes assistant treasurer as well as assistant vice president. **Ward Beecher** succeeds the late Mr. Cushwa as chairman of the board of directors of Commercial Shearing & Stamping Inc.

A. O. Holmberg was elected vice president in charge of manufacturing, **Goss Printing Press Co.,** Chicago. During World War II he was engaged by A. O. Smith Corp. to take charge of building and tooling a plant for production of hollow steel propellers and on completion of the plant was placed in charge of operations. This division closed after the war, and Mr. Holmberg became manager of several A. O. Smith divisions. Subsequently, he joined Goss as works manager.

Richard D. Maystead, vice president of manufacturing, was also appointed director of engineering for **Pacific Airmotive Corp.,** Burbank, Calif.

Louis M. Fehrenbach, formerly vice president and general manager, **Indianapolis Drop Forging Co.,** Indianapolis, was elected president and general manager.

Appointments at the Gary, Ind., Sheet & Tin Mill Division, **United States Steel Co.,** include **I. J. Paul** as tin mill division superintendent, **Robert W. Holman,** division superintendent of maintenance, and **Henry S. Gordon,** chief engineer. **Alfred T. Duff,** former division superintendent, tin mill, was transferred to the company's Fairless Works.

Gen. Donald Armstrong, president, **United States Pipe & Foundry Co.,** Burlington, N. J., since 1948, has resigned as president and director to accept a post abroad in connection with economic mobilization in Europe. **N. F. S. Russell,** chairman of the board of directors, was elected president. **Hubert F. O'Brien,** president, A. P. Smith Mfg. Co., was elected a director of U. S. Pipe & Foundry. **James J. Reynolds Jr.** resigned as a member of the NLRB to return to the pipe company as assistant to the chairman of the board.

Blaw-Knox Co., Pittsburgh, appointed **John E. Didrickson** as Middle West representative of its steel plant equipment department. With headquarters in Chicago, he will serve the steel, glass and nonferrous industries in connection with Blaw-Knox water-cooled equipment and furnace accessories.

Knapp Bros. Mfg. Co., Cincinnati, affiliate company of Steelcraft Mfg. Co., elected **J. W. Gruber** vice president and general manager; **Tom Lehman,** vice president in charge of engineering; and **R. C. Meier Jr.,** sales manager. Mr. Gruber, for the last four years, operated the Steelcraft Building Sales Co. in Chicago. Mr Lehman has been chief engineer of Knapp Bros. Mr. Meier has been assistant sales manager.

W. Thomas Peterson, general sales manager, **Beryllium Corp.,** Reading, Pa., resigned Dec. 1, 1951. His resignation will take effect Feb. 1. Mr. Peterson will return to Detroit where he will re-enter the manufacturers' agency business.

Tennessee Coal, Iron & Railroad Division, Birmingham, U. S. Steel Co., appointed **John L. Mortimer** to succeed **Ernest D. LeMay,** resigned, as Southeast district public relations director, with headquarters in Birmingham. **Stephen T. McGinnis** was promoted to associate director of the Southeast district and **R. Clay Bailey,** presently field representative in the Gulf-Southwest district which continues under supervision of Mr. Mortimer, was appointed associate director of that district. Mr. LeMay retires

J. W. GRUBER

Knapp Bros. V. P.-gen. mgr.

TOM LEHMAN

Knapp Bros. V. P.-engineering

I. J. PAUL

Gary supt., U. S. Steel

ROBERT W. HOLMAN

maintenance supt., U. S. Steel Gary Div.

ARTHUR L. STEWART
vice chairman, Gleason board

RALPH J. PRICE
Bethlehem Pacific L. A. metallurgist

ADOLPH J. DeMATTEO
chief engineer, Watson-Stillman

JOHN WALDHERR JR.
directs Chefford engineering

after 40 years with TC&I, 15 years as public relations director.

Gleason Works, Rochester, N. Y., elected **Arthur L. Stewart,** vice president, as vice chairman of the board, and **Frederick E. McMullen, Dwight VandeVate** and **William M. Woodruff** as vice presidents. **L. O. Carlson** was appointed chief engineer in charge of new design, and **Meriweather Baxter,** chief research engineer. **Oliver F. Bauer, Philip H. Goeltz** and **Robert R. Pigage** were made assistant chief engineers. **George Hessler** and **Herbert G. Hartman** were named assistant works managers, and **F. Lester Knowles,** chief gear engineer.

Ralph J. Price was appointed chief metallurgist for the Los Angeles plant of **Bethlehem Pacific Coast Steel Corp.** He was formerly metallurgical supervisor.

Personnel changes in the sales department of **Harbison-Walker Refractories Co.,** Pittsburgh, are: **H. G. Hart,** formerly of the Portsmouth, O., sales district, transferred to the new specialties and retail department in Pittsburgh; **Floyd A. Pearce** transfers from the Pittsburgh sales district to succeed Mr. Hart at Portsmouth. **E. A. Olson** replaces Mr. Pearce at Pittsburgh.

Watson-Stillman Co., Roselle, N. J., appointed **Adolph J. DeMatteo** chief engineer. He joined the company in 1944 and since 1946 has held the position of assistant chief engineer. In his new position he directs engineering activities for the company, designer and manufacturer of hydraulic machinery for the plastics, metalworking and railroad industries.

Trimedge Inc., Youngstown, metal molding concern, elected new officers: **Marvin H. Itts,** president and founder, becomes chairman of the board; **William L. Donnell,** vice president-general manager, becomes president; **Paul O. Horsch,** controller, becomes treasurer; **Max Heizler,** manager of operations, becomes vice president-operations; and **P. T. Lutz,** purchasing agent, becomes vice president-sales.

John Waldherr Jr. was appointed director of engineering, **Chefford Master Mfg. Co.,** Fairfield, Ill. He joined the company in 1947 and has served as chief design engineer since 1949.

Appointments announced for the Chicago district sales office of **American Steel & Wire Co.,** subsidiary, U. S. Steel Corp., include: **Fred L. Nonnenmacher,** named manager, succeeding **E. A. Murray,** resigned. **S. W. Goodenough** succeeds Mr. Nonnenmacher as manager of the manufacturers' product sales department in Chicago, while **R. H. Hauger** succeeds Mr. Goodenough as assistant manager of manufacturers' products sales.

Walter Dietz, head of Electrolux Corp., New York, is the new president of **Vacuum Cleaner Manufacturers' Association.**

Material Handling Institute Inc., Washington, elected the following as officers for 1952: President, **L. West Shea,** manager, materials handling sales, Union Metal Mfg. Co.; 1st vice president, **John C. Mevius,** sales manager, materials handling and hydraulic division, American Engineering Co; and 2nd vice president, **Howard M. Palmer,** general sales manager, Lewis-Shepard Products Inc.

E. G. Sammann was appointed West Coast representative for **Sandvik Steel Co.,** New York, with headquarters at Pasadena, Calif.

James Boyd was appointed exploration manager and **Georges Ordonez** as chief geologist, **Kennecott Copper Corp.,** New York. Mr. Boyd resigned his position as director of the U. S. Bureau of Mines Oct. 16, 1951. Mr. Ordonez spent several years in Central America with American oil companies before joining the exploration staff of Kennecott in 1945. **Lowell B. Moon,** chief of the minerals division, U. S. Bureau of Mines, joins the exploration staff. **L. S. Breckon** was named district geologist with headquarters in Sydney, Australia.

Phil Block was appointed special sales representative in the foundry sales department of **Frederic B. Stevens Inc.,** Detroit. He formerly was associated with Michigan Steel Casting Co.

Robert L. Summerville, assistant general sales manager, Electric Storage Battery Co., Philadelphia, was elected president of the **Association of American Battery Manufacturers.**

William S. Snead, vice president and treasurer of **Emerson Electric Mfg. Co.,** St. Louis, since 1942, has retired. He has been a director of the company since 1936 and continues to serve in that capacity. **Ralph E. Petering,** who was elected vice pres-

WEAN ENGINEERING Company, Inc.

WARREN, OHIO

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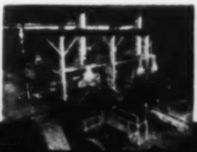

WEAN EQUIPMENT

[illegible] wire mill equipment [illegible]

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FOR
WIRE MACHINERY**

LAVALLEE & IDE, INC.

The Finest in Quality Reamers

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The Reamer Specialists

LAVALLEE & IDE, INC.
CHICOPEE, MASS.

M. G. PURPUS
Black, Sivalls & Bryson sales div.

LON E. RUSSELL
sales engineer for Dravo

ident and assistant treasurer in 1951, has assumed the duties of vice president and treasurer.

M. G. Purpus was appointed sales manager, special products division, **Black, Sivalls & Bryson Inc.,** Kansas City, Mo. In addition he will serve as administrative assistant to the general sales manager.

Clarence B. Randall, president, **Inland Steel Co.,** Chicago, was designated the chief executive officer of the company. **Edward L. Ryerson,** chairman, whose office previously carried top executive responsibility, and who was due to retire Jan. 1, will continue as chairman but in a consultive and advisory capacity. **Joseph L. Block** was elected executive vice president and chairman of the finance committee. He was vice chairman and vice president-sales. **John F. Smith Jr.,** general manager-sales, was elected vice president in charge of sales. **L. E. Block,** one of the founders of the company who served as chairman of the board from 1919 to 1940 and chairman of the finance committee since that time, was elected honorary chairman of the board.

Lon E. Russell was appointed sales engineer for the machinery division of **Dravo Corp.,** Pittsburgh, to cover the metropolitan New York territory. He will handle sales of Dravo counterflo heaters and crane cab coolers. **Clyde H. Slease** was appointed administrative assistant to the president of Dravo. He also continues as legal counsel, a position he has held since 1948.

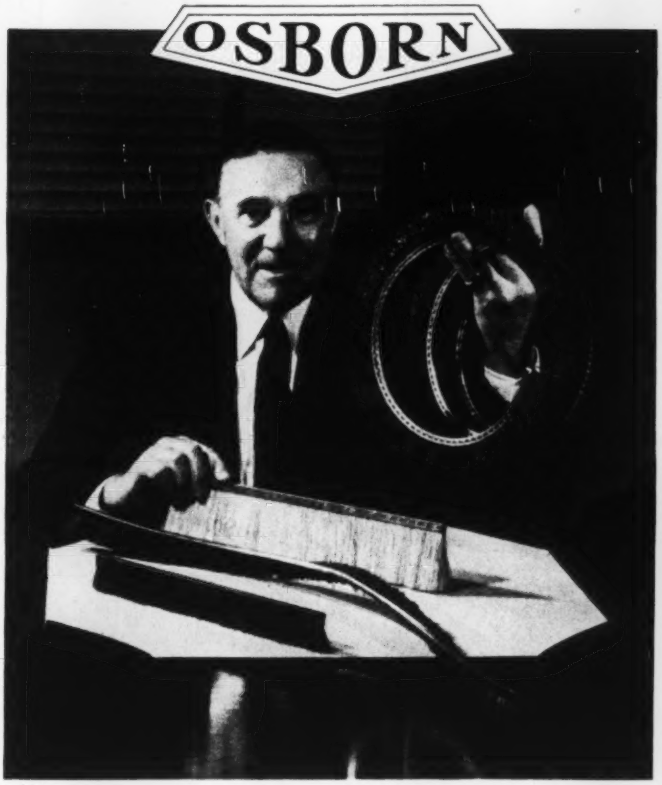
National Twist Drill & Tool Co., Rochester, Mich., elected **Howard L. McGregor Sr.** as chairman of the board, and **Howard L. McGregor Jr.** as president of the company which manufactures rotary metal cutting tools.

E. V. Erickson was elected president, **Keller Tool Co.,** Grand Haven, Mich. **B. P. Sherwood Sr.** was elected chairman of the board. Other officers elected are **R. C. Fenner,** vice president, and **B. F. Sherwood Jr.,** secretary-treasurer.

CLARENCE B. RANDALL
chief exec. officer, Inland Steel

JOSEPH L. BLOCK
exec. V. P., Inland Steel

OSBORN



Heard about these ways to find manpower?

And cut costs! Every manufacturer should know about this brush . . . the Osborn Master® Strip. In its more than a thousand forms, shapes and sizes, this power brush . . . at the push of a button . . . is doing jobs formerly requiring many skilled hands. It is boosting output, improving product quality and slashing costs.

Master Strip can be used in special mountings—straight, curved or coiled in a helix. Its fill material can be wire, hair, fibre, textiles or synthetics in trim lengths from 1 to 10 inches. It comes in any length up to 120 inches. Name your problem—cleaning, scrubbing, finishing or many others. It can be matched to *your* job!

The nearby **O**sborn **B**rushing **A**nalyst will gladly study *your* manufacturing operations and explain how you can benefit with this versatile tool! Call today or write *The Osborn Manufacturing Company, Dept.* 597, *5401 Hamilton Avenue*, Cleveland 14, Ohio.

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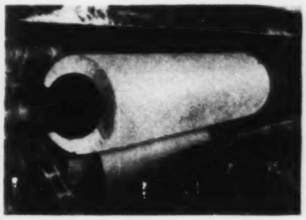
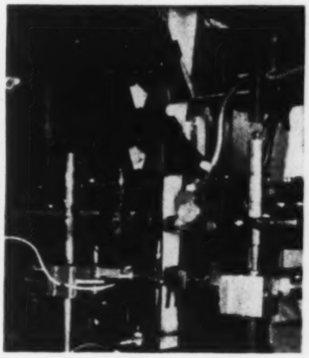


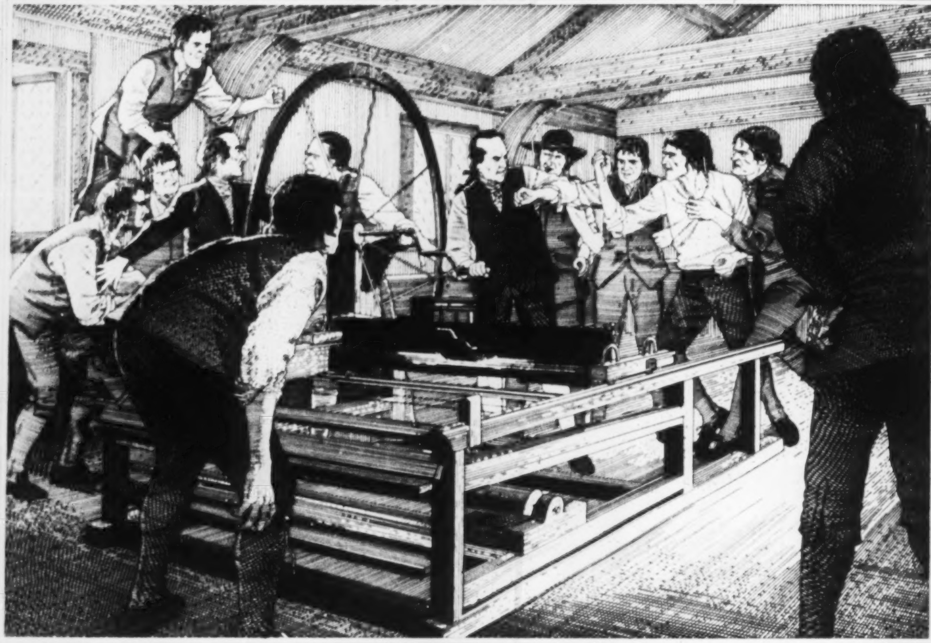
SCRUBS STEEL. Master Strip wound helically around a steel core becomes an Osborn Heli-Master® Brush. Here it scrubs strip steel preparatory to electrolytic tinning. In this mill, six of these Heli-Master Brushes clean the strip at 1500 feet per minute, working around the clock.

PREPARES GLASS. Here Heli-Master brushes clean glass and apply a uniform film of binder for silvering compound. Replace hand operation. Steps up mirror production and cuts rejects.



KILLS STATIC. These brass wire Strip Brushes are used in a tea-bagging machine to remove static from the bag paper. Speeds filling and sealing of bags.

WHAT'S YOUR PROBLEM?
The **O**sborn **B**rushing **A**nalyst nearby will gladly help. Call him today!



This craftsman's genius started a revolution!

Poor British weaver James Hargreave didn't know what he started in 1757.

His spinning "jenny" spun not one, but 120 different cotton threads at a time . . . aroused his fellows who feared the machine would displace them. Ultimately, they benefited by the mass production of better, cheaper products . . . result of the Industrial Revolution which Hargreave's invention helped launch.

A clue to this craftsman's success is the heed he paid in hand-crafting every fastener. He knew that the strength of his entire assembly rested on them.

Makers of modern textile machines are even more aware of the need for quality fasteners, vital to today's stepped-up production . . . to speed and strengthen assembly, save scarce materials by reducing rejects. Fortunately, these contemporary craftsmen have *specialists* to aid them, like the Russell, Burdsall & Ward Bolt and Nut Company worker in the photograph. He devotes a craftsman's skill to producing bolts, nuts, screws and rivets of uniform accuracy, dependability and physical properties . . . backed up by 106 years of RB&W experience in making the finest fasteners.

May we apply our specialized skill to your fastener problems? We have the facilities and the ability to handle them. Address RB&W at Port Chester.

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RB&W *the complete quality line*

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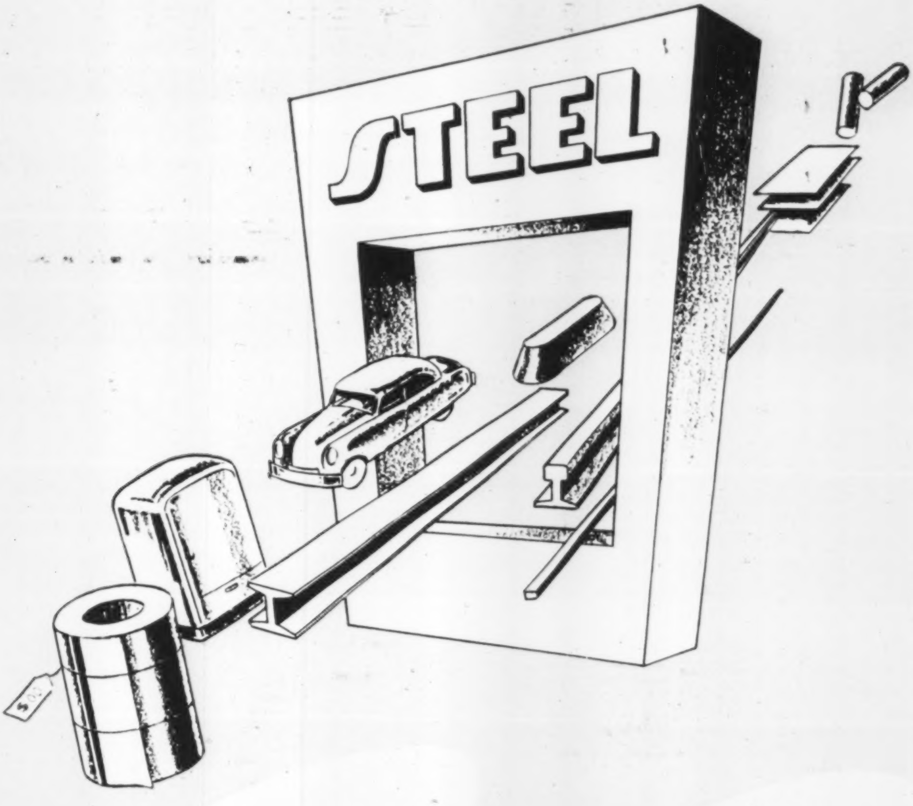

1952 METALWORKING FACTS and FIGURES

• This is the fourth annual edition of Metalworking Facts and Figures. It not only continues and brings up to date the statistics published a year ago but it is expanded 50 per cent. Its contents encompass a wide sphere: From raw materials all the way through the end products of the metal consuming industries. Also, there are such related subjects as labor, prices and earnings. Whether you want to know how much steel was made, how many refrigerators were produced or what the corporate income was, look inside for the answer.

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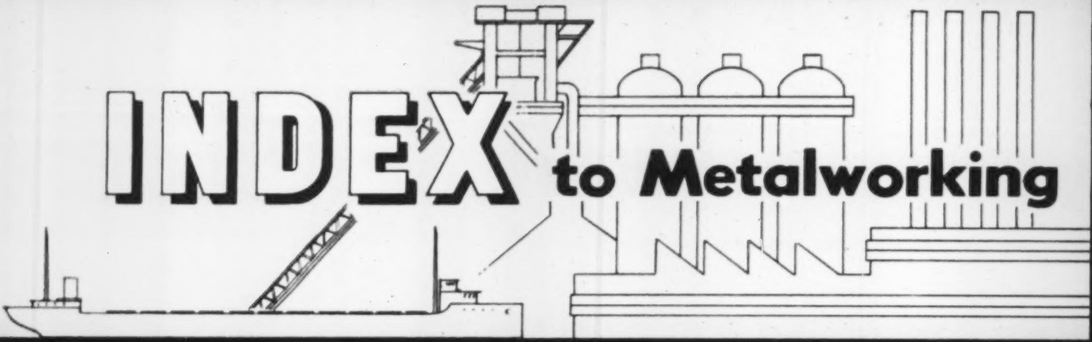

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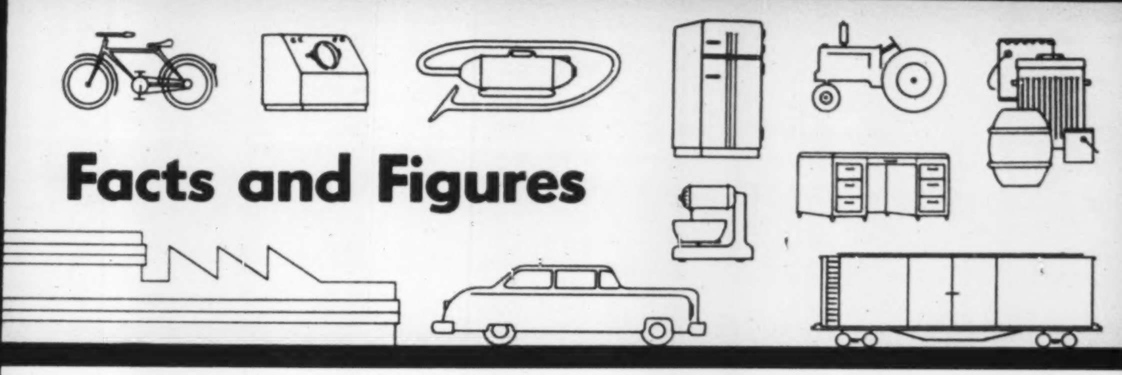

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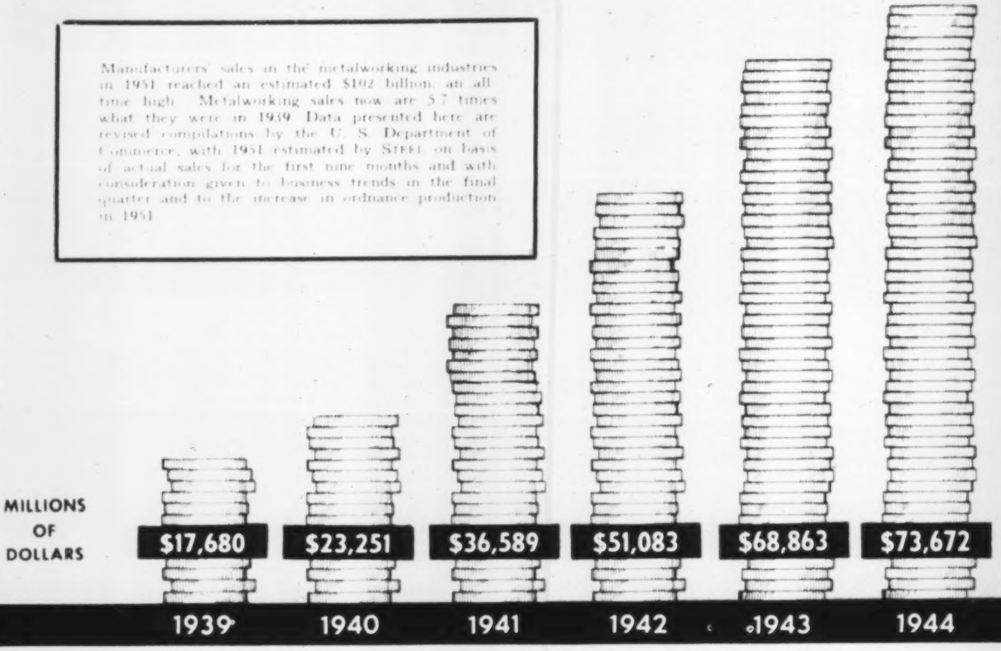
METALWORKING America's

Manufacturers' sales in the metalworking industries in 1951 reached an estimated $102 billion, an all-time high. Metalworking sales now are 5.7 times what they were in 1939. Data presented here are revised compilations by the U. S. Department of Commerce, with 1951 estimated by STEEL on basis of actual sales for the first nine months and with consideration given to business trends in the final quarter and to the increase in ordnance production in 1951.



MANUFACTURERS' SALES IN METALWORKING INDUSTRY†

(Millions of Dollars)

New Standard Industrial Classifications	Primary Metals	Fabricated Metal Products	Machinery Except Electrical	Electrical Machinery and Equipment	Transportation Equipment	Instruments	TOTAL Metalworking Industry
1951*	22,595	12,549	21,097	12,522	25,522	2,830	97,115‡
1950	19,626	11,601	15,951	10,915	22,712	2,288	83,093
1949	11,786	9,175	14,070	8,406	18,900	1,860	67,197
1948	17,153	10,200	15,731	8,890	17,476	2,043	71,493

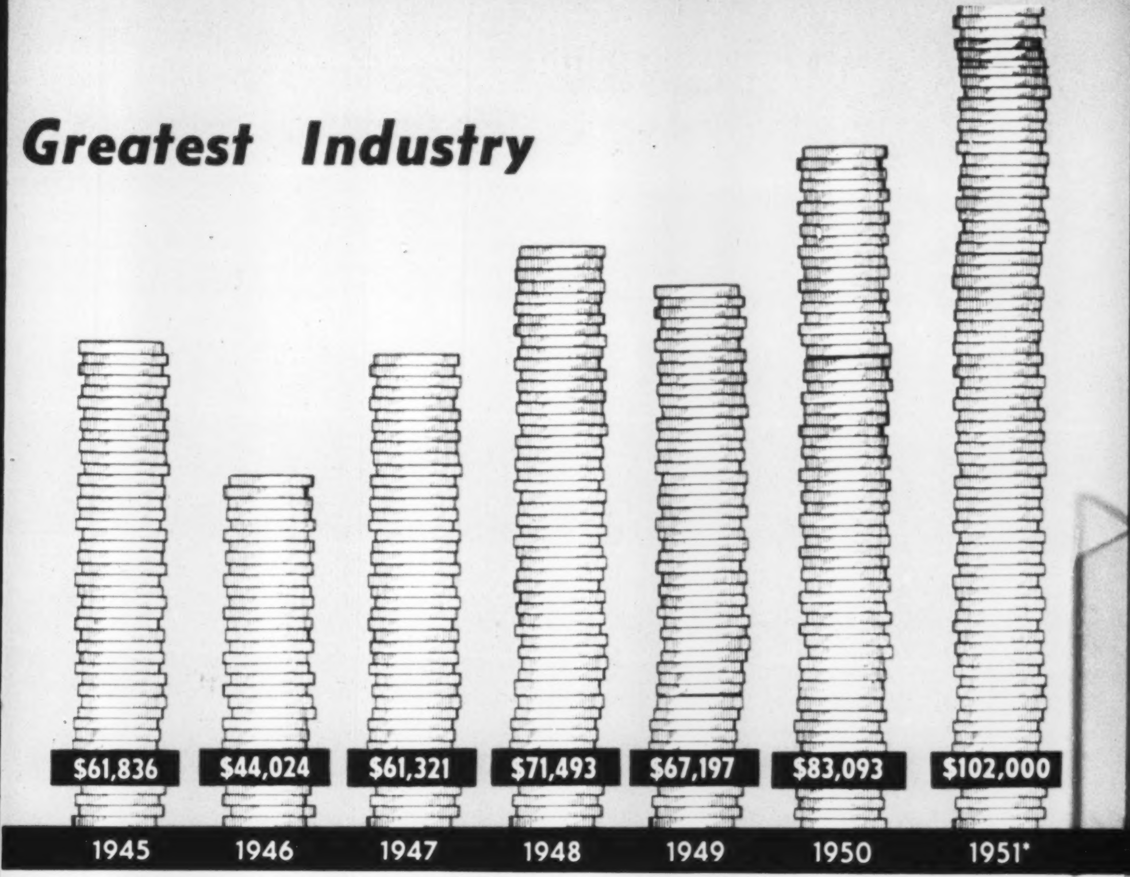
Former Industry Group Classifications	Iron-Steel and Products	Nonferrous Metal and Products	Electrical Mach. and Equipment	Machinery Except Electrical	Automobiles and Equipment	Trans. Equip. Except Automobiles	TOTAL Metalworking Industry
1948	22,188	5,946	9,024	15,658	13,662	3,818	70,296
1947	19,472	5,633	8,299	13,697	11,178	3,042	61,321
1946	14,202	4,705	5,658	9,824	6,624	3,011	44,024
1945	16,812	4,463	6,302	11,640	11,446	11,173	61,836
1944	17,795	4,755	7,104	12,907	15,096	16,015	73,672
1943	16,772	4,595	5,734	12,286	13,422	16,054	68,863
1942	14,563	3,411	4,550	10,370	7,956	10,233	51,083
1941	11,921	3,065	3,769	7,390	6,530	3,914	36,589
1940	7,678	2,120	2,483	4,697	4,697	1,576	23,251
1939	6,079	1,726	1,861	3,571	3,578	865	17,680

† Figures for 1948 and later represent a shift to the Standard Industrial Classification system. Data for 1948 are presented on the old industry group classification as well as the new.

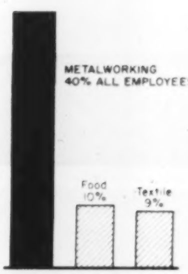
‡ Before allowance for ordnance production. Figure after such allowance is $102 billion.

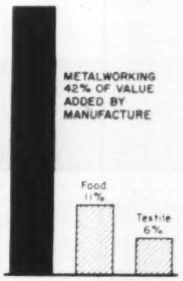
* Estimate for 1951 is by STEEL. Figures for other years are from Office of Business Economics.

Greatest Industry



HOW METALWORKING COMPARES WITH OTHER MANUFACTURING INDUSTRIES





Standard Industrial Classifications	TOTAL NUMBER PLANTS†	NUMBER OF EMPLOYEES*	VALUE Added by Manufacture (Thousands)*
20. Food and Kindred Products	39,933	1,480,685	$10,094,708
21. Tobacco Manufactures	1,086	92,323	806,118
22. Textile Mill Products	8,185	1,239,121	5,624,030
23. Apparel and Related Products	30,960	1,128,892	4,174,430
24. Lumber and Products	26,231	748,993	3,165,760
25. Furniture and Fixtures	7,687	342,000	1,666,898
26. Paper and Allied Products	4,103	473,371	3,432,115
27. Printing and Publishing	28,986	759,065	4,902,972
28. Chemicals and Allied Products	10,073	640,199	7,236,618
29. Petroleum and Coal Products	1,387	206,785	2,138,570
30. Rubber Products	875	236,442	1,609,586
31. Leather and Leather Products	5,308	380,723	1,498,811
32. Stone, Clay and Glass Products	11,650	485,337	3,138,263
33. Primary Metal Industries	**5,363**	**1,127,674**	**7,950,990**
34. Fabricated Metal Products	**16,734**	**980,723**	**6,210,759**
35. Machinery (except Electrical)	**17,906**	**1,363,866**	**8,764,652**
36. Electrical Machinery	**3,973**	**759,873**	**4,793,948**
37. Transportation Equipment	**3,711**	**1,216,387**	**8,546,828**
38. Instruments	**2,599**	**230,451**	**1,418,291**
Total Metalworking Industry	**50,286**	**5,678,974**	**37,685,468**
39. Miscellaneous Manufactures	14,131	476,897	2,501,432

† Based on 1947 Census of Manufactures
* Based on 1950 Annual Survey of Manufactures

World Production

METALWORKING FACTS AND FIGURES

By Countries—Net Tons

STEEL INGOT AND CASTINGS OUTPUT

	1951a	1950	1949	1948	1947	1946	1945	1944
World Total	228,945,000	209,191,445	177,463,078	168,764,990	147,200,111	120,881,060	120,583,828	163,586,576
United States	105,145,000	96,836,075	77,978,176	88,640,470	84,894,071	66,602,724	79,701,648	89,641,600
Canada	3,850,000	3,381,280	3,190,430	3,198,720	2,945,936	2,334,640	2,877,952	3,016,160
Great Britain	17,150,000	18,248,160	17,419,250	16,661,800	14,250,880	14,218,736	13,244,000	13,599,264
France (b)	10,500,000	9,517,200	10,672,200	7,959,600	6,317,766	4,858,000	1,831,200	3,407,600
Saar	2,875,000	2,087,800	1,932,700	1,350,800	780,216	Included in Germany		
Belgium	5,575,000	4,164,600	4,252,600	4,308,700	3,179,270	2,517,200	812,000	685,440
Luxembourg	3,425,000	2,696,100	2,499,200	2,698,300	1,887,726	1,426,096	291,200	1,398,544
Italy	3,275,000	2,598,200	2,260,500	2,337,500	1,874,502	1,270,640	436,800	1,130,752
Spain	900,000	900,020	791,560	631,680	596,182	660,800	616,000	700,000
Sweden	1,550,000	1,604,900	1,530,100	1,382,700	1,312,482	1,324,624	1,316,000	1,316,000
Germany (c)	16,700,000	15,874,100	11,611,600	6,482,300	3,490,034	3,318,448	1,705,984	20,187,888
Austria	1,150,000	1,037,740	918,060	712,800	394,516	206,080	159,504	1,116,416
The Netherlands	600,000	539,330	470,470	380,800	....	....	....	....
Czechoslovakia	3,600,000	3,312,100	3,038,200	2,915,000	2,519,172	1,842,624	1,047,200	2,802,576
Poland	3,300,000	2,761,000	2,533,300	2,150,000	1,740,058	1,344,000	545,552	2,149,056
Hungary	1,300,000	1,124,200	933,900	820,000	662,302	392,000	141,904	573,888
Rumania	700,000	613,800	504,900	373,000	....	....	....	....
Yugoslavia	500,000	462,000	438,900	400,000	....	....	....	....
U.S.S.R.	33,400,000	30,300,000	25,600,000	18,150,000	14,300,000	13,440,000	10,080,000	8,960,000
Japan (d)	7,250,000	5,345,760	3,549,700	1,900,000	1,070,042	700,000	1,173,700	8,099,168
India	1,650,000	1,608,320	1,515,360	1,344,000	1,389,732	1,457,120	1,515,136	1,533,168
Australia	1,550,000	1,597,120	1,341,650	1,424,640	1,511,328	1,124,144	1,573,600	1,784,048
South Africa	1,000,000	832,160	804,100	766,080	658,896	555,184	588,448	533,008
Brazil	900,000	844,480	676,610	531,300	426,900	378,015	226,530	241,235
Mexico	300,000	250,000	379,610	294,800	353,100	276,100	211,200	199,320
Miscellaneous	800,000	655,000	620,000	950,000	645,000	633,885	458,270	511,445

(a) Estimated

(b) Without Alsace Lorraine until 1945

(c) All Germany within present boundaries, but without Saar since 1947

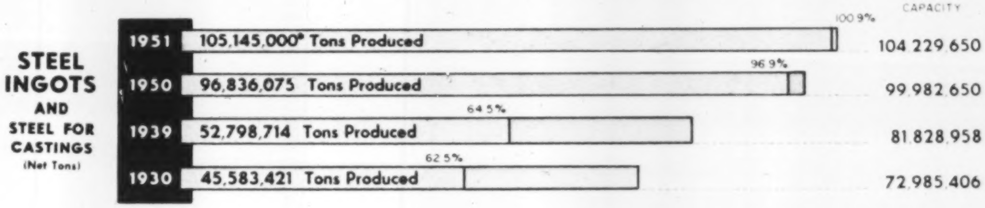
(d) Including Korea and Manchukuo until July, 1946

PIG IRON AND FERROALLOYS OUTPUT

	1951a	1950	1949	1948	1947	1946	1945	1944
World Total	[illegible]	146,264,551	127,437,775	124,250,500	107,661,844	81,510,946	85,219,845	118,256,582
United States	71,304,000	66,400,311	54,916,785	61,911,500	60,117,319	46,199,826	54,919,029	62,866,198
Canada	2,750,000	2,480,400	2,330,480	2,366,440	2,190,048	1,520,736	1,956,080	2,023,952
Great Britain	10,700,000	10,788,850	10,638,320	10,359,070	8,719,200	8,692,544	7,960,288	7,544,880
France (b)	[illegible]	8,537,100	9,170,500	7,211,500	5,384,372	3,857,280	1,303,680	3,188,640
Saar	2,000,000	1,850,200	1,740,200	1,247,400	719,606	Included in Germany		
Belgium	5,250,000	4,061,200	4,123,000	4,337,300	3,107,640	2,392,656	803,040	779,520
Luxembourg	3,470,000	2,745,900	2,609,200	2,886,400	2,063,436	1,504,384	330,560	1,485,568
Italy	1,225,000	570,900	448,800	578,000	425,372	192,864	87,360	336,784
Spain	725,000	722,260	676,000	581,500	554,306	540,960	516,320	604,800
Sweden	875,000	920,700	945,670	858,480	800,052	750,400	862,400	952,000
Germany (c)	12,000,000	11,053,900	8,404,000	5,350,000	2,640,392	2,707,824	4,237,600	15,835,792
Austria	1,150,000	971,410	921,470	688,200	306,356	63,840	110,208	1,061,312
The Netherlands	570,000	499,620	477,400	486,200	....			....
Czechoslovakia	2,500,000	2,257,000	2,071,000	1,850,000	1,568,146	1,055,400	635,040	1,724,800
Poland	1,650,000	1,375,000	1,367,000	1,210,000	957,638	800,800	268,800	1,206,800
Hungary	650,000	550,000	473,000	445,000	339,416	175,840	48,160	230,720
U.S.S.R.	23,500,000	21,500,000	18,500,000	15,400,000	12,500,000	10,080,000	8,400,000	7,840,000
Japan (d)	3,300,000	2,550,000	1,740,480	914,100	409,940	203,840	1,400,000	6,192,592
India	2,000,000	1,881,600	1,804,320	1,639,700	1,553,269	1,584,912	1,554,000	1,616,384
Australia	1,425,000	1,478,400	1,170,400	1,383,900	1,280,384	978,656	1,298,640	1,462,048
South Africa	850,000	806,400	780,980	706,100	707,952	597,184	612,640	519,792
Brazil	780,000	774,400	562,870	607,200	426,827	378,015	226,530	241,235
Miscellaneous	1,640,000	1,480,000	1,530,000	1,200,000	953,173	629,985	669,470	542,765

Production-Capacity

METALWORKING FACTS AND FIGURES



ANNUAL STEEL CAPACITY AND PRODUCTION BY PROCESSES

	Open-hearth		Bessemer		Crucible		Electric		TOTAL		Per Cent
	Capacity	Production	Capacity	Production	Capacity	Production	Capacity	Production	Capacity†	Production	Capacity
1951	91,054,020	....	5,621,000	....	20	‡	7,554,610	....	104,229,650	105,145,000*	100.9*
1950	86,984,490	86,262,509	5,537,000	4,534,558	20	‡	6,871,290	6,039,008	99,392,800	96,836,075	96.9 #
1949	84,817,040	70,248,803	5,191,000	3,946,656	20	‡	6,112,870	3,782,717	96,120,930	77,978,176	81.1
1948	83,610,690	79,340,157	5,226,000	4,243,172	20	‡	5,396,750	5,057,141	94,233,460	88,640,470	94.1
1947	81,010,990	76,873,793	5,154,000	4,232,543	20	‡	5,076,240	3,787,735	91,241,250	84,894,071	93.0
1946	81,236,250	60,711,963	5,154,000	3,327,737	20	‡	5,500,290	2,563,024	91,890,560	66,602,724	72.5
1945	84,171,590	71,939,602	5,874,000	4,305,318	3,800	24	5,455,890	3,456,704	95,505,280	79,701,648	83.5
1944	82,223,610	80,363,953	6,074,000	5,039,923	3,800	25	5,350,880	4,237,699	93,652,290	89,641,600	95.5
1943	79,180,880	78,621,804	6,553,000	5,625,492	3,800	146	4,554,980	4,589,070	90,292,660	88,836,512	98.1
1942	78,107,260	76,501,957	6,721,400	5,553,424	3,800	2,010	3,737,510	3,974,540	88,569,970	86,031,931	96.8
1941	74,565,510	74,389,619	6,996,520	5,578,071	3,942	2,313	2,586,320	2,869,256	84,152,292	82,839,259	97.3
1940	73,721,592	61,573,083	6,009,920	3,708,573	5,354	1,024	1,882,630	1,700,006	81,619,496	66,982,686	82.1
1939	72,959,638	48,409,800	7,138,880	3,358,916	5,354	931	1,725,086	1,029,067	81,828,958	52,798,714	64.5
1938	71,472,370	29,080,016	7,212,800	2,106,340	9,610	7	1,490,858	565,627	80,185,638	31,751,990	39.6
1937	69,725,736	51,824,979	7,084,000	3,863,918	11,850	1,046	1,326,788	947,002	78,148,374	56,636,945	72.5
1936	68,946,829	48,760,463	8,058,400	3,873,472	11,850	914	1,147,221	865,150	78,164,300	53,499,999	68.4
1935	68,544,310	34,401,280	8,842,400	3,175,236	11,850	719	1,053,370	606,471	78,451,930	38,183,706	48.7
1934	68,222,445	26,354,838	8,842,400	2,421,840	18,704	595	1,044,867	404,651	78,128,416	29,181,924	37.4
1933	68,241,286	22,827,473	8,872,668	2,720,246	23,684	763	1,476,765	471,747	78,614,403	26,020,229	33.1
1932	68,176,102	13,336,210	9,072,420	1,715,925	24,725	722	1,507,666	270,044	78,780,913	15,322,901	19.5
1931	66,642,430	25,210,714	9,080,820	3,386,259	30,891	1,733	1,503,662	460,255	77,257,803	29,058,961	37.6

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* Estimated by STEEL. ‡ Included with electric steel. † As of Jan. 1. # Based on average annual capacity of 99,982,650 tons. American Iron & Steel Institute.

MONTHLY OUTPUT OF STEEL FOR INGOTS AND CASTINGS

	Open-hearth		Bessemer		Electric		Total		Calculated Net Tons Weekly	No. weeks in mo.
	Net Tons	% Capac.	Net Tons	% Capac.	Net Tons	% Capac.	Net Tons	% Capac.		
1951	....	....	......	...	......	...	....	...	....	...
Jan.	7,844,982	101.4	431,725	90.4	566,460	88.3	8,843,167	99.9	1,996,200	4.43
Feb.	6,935,512	99.3	326,112	75.6	504,077	87.0	7,765,701	97.1	1,941,425	4.00
Mar.	8,059,625	104.2	408,926	85.6	602,504	93.9	9,071,055	102.4	2,047,642	4.43
Apr.	7,857,161	104.9	392,472	84.9	590,888	95.1	8,840,521	103.1	2,060,728	4.29
May	8,071,270	104.3	408,650	85.6	614,579	95.7	9,094,499	102.7	2,052,934	4.43
June	7,667,811	102.3	403,001	87.1	586,148	94.3	8,656,960	100.9	2,017,939	4.29
July	7,704,433	99.8	411,599	86.4	563,215	87.9	8,679,247	98.2	1,963,631	4.42
Aug.	7,693,322	99.4	436,822	91.5	603,448	94.0	8,733,592	98.6	1,971,465	4.43
Sept.	7,652,167	102.4	404,726	87.7	598,004	96.4	8,654,897	101.2	2,022,172	4.28
Oct.	8,027,006	103.8	458,128	95.9	631,000	98.3	9,116,134	102.9	2,057,818	4.43
Nov.	7,746,000	103.4	412,000	89.1	627,000	100.9	8,785,000	102.4	2,048,000	4.29
1950	86,262,509	98.7	4,534,558	81.3	6,039,008	86.5	96,836,075	96.9	1,857,232	52.14
Jan.	7,136,227	96.6	379,252	80.6	426,318	73.0	7,941,797	94.0	1,792,731	4.43
Feb.	6,145,634	92.1	255,565	60.2	401,833	76.2	6,803,032	89.2	1,700,758	4.00
Mar.	6,750,884	91.3	265,726	56.5	481,212	82.4	7,497,822	88.8	1,692,511	4.43
Apr.	7,318,720	102.3	407,909	89.5	497,875	88.1	8,224,504	100.6	1,917,134	4.29
May	7,601,880	102.9	437,006	92.9	525,321	90.0	8,564,207	101.4	1,933,230	4.43
June	7,222,185	100.9	406,944	89.3	514,101	90.9	8,143,230	99.6	1,898,189	4.29
July	7,224,306	97.0	380,317	79.8	478,299	79.7	8,082,922	94.8	1,828,715	4.42
Aug.	7,318,908	98.0	405,118	84.8	518,148	86.1	8,242,174	96.5	1,860,536	4.43
Sept.	7,262,359	100.7	409,216	88.7	533,422	91.7	8,204,997	99.4	1,917,055	4.28
Oct.	7,734,714	103.6	436,835	91.5	581,137	96.6	8,752,686	102.4	1,975,776	4.43
Nov.	7,111,829	98.4	370,659	80.1	540,905	92.8	8,023,393	97.0	1,870,255	4.29
Dec.	7,434,863	99.8	380,011	79.8	540,437	90.0	8,355,311	98.0	1,890,342	4.42

PIG IRON†

CAPACITY and PRODUCTION

Net Tons

	Capacity	Production	%
1951	72,471,780	71,304,000	98.4
January		5,894,403	95.7
February		5,176,334	93.1
March		6,015,662	97.7
April		5,888,202	98.7
May		6,173,360	100.3
June		5,977,656	100.2
July		6,069,754	98.8
August		6,062,753	98.5
September		5,890,102	99.0
October		6,197,176	100.6
November			
December			
1950	71,560,110	65,439,769	91.4
1949	70,541,850	54,175,534	76.8
1948	67,438,930	61,043,806	90.5
1947	65,709,200	59,314,348	90.3
1946	67,340,590	45,547,907	67.6
1945	67,313,890	54,166,482	80.5
1944	67,921,410	62,072,683	91.4
1943	64,188,220	61,920,314	96.5
1942	60,606,850	60,115,387	99.2
1941	57,774,640	56,070,506	97.1
1940	55,723,640	46,979,091	84.3
1939	56,325,830	35,396,478	62.8
1938	56,782,208	21,182,569	37.3
1937	55,557,305	41,171,187	74.1
1936	55,854,280	34,476,170	61.7

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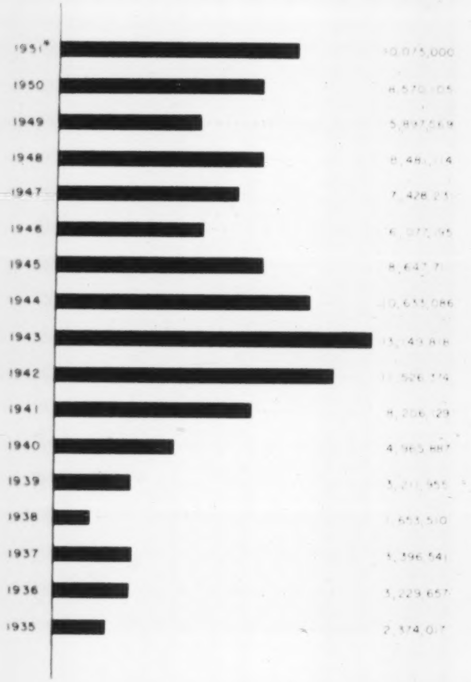
* Estimated by STEEL. † Including ferroalloys made in blast furnaces. American Iron & Steel Institute.

Ferrous Production

ALLOY STEEL PRODUCTION

Total Ingots and Castings—Net Tons



ALLOY STEEL PRODUCTION BY PROCESSES

Ingots and Castings—Net Tons

	Open-hearth Basic	Open-hearth Acid	Open-hearth Total	Bessemer	Crucible	Electric
1951‡			5,690,314	....	†	2,705,271
1950	5,738,067	123,253	5,861,320	....	†	2,708,785
1949	4,192,344	105,550	4,297,894	....	†	1,599,675
1948	6,285,054	128,915	6,413,969	....	†	2,067,145
1947	5,520,540	128,754	5,649,294	....	†	1,778,937
1946	4,325,657	115,711	4,441,368	....	†	1,635,827
1945	5,572,353	274,889	5,847,242	....	18	2,800,451
1944	6,494,627	515,662	7,010,289	....	23	3,622,774
1943	8,539,523	677,416	9,216,939	....	136	3,932,743
1942	7,524,209	608,867	8,133,076	....	522	3,392,776
1941	5,306,415	433,240	5,739,655	3,890	933	2,461,651
1940	3,421,961	252,965	3,674,926	3,990	255	1,286,716
1939	2,302,273	156,581	2,458,854	3,486	231	749,384
1938	1,179,031	102,089	1,281,120	13	5	372,372
1937	2,559,200	164,455	2,723,655	....	270	672,616
1936	2,508,671	129,658	2,638,329	....	234	591,094
1935	1,829,566	82,208	1,911,774	....	172	462,071
1934	1,431,744	38,685	1,470,429	60	115	335,144

‡ First ten months

† Included with electric steel

American Iron & Steel Institute

* Estimated

Stainless Steel Production

Net Tons of Ingots

Type Number	9 mos. 1951	12 mos. 1950	Type Number	9 mos. 1951	12 mos. 1950
301	17,903	61,425	414	2,322	4,584
302	80,327	169,444	416	25,154	27,480
302B	117	1,245	420	4,482	7,360
303	17,788	19,750	430	268,764	221,301
304	73,476	129,447	430F	1,513	2,177
308	4,694	3,208	431	3,148	2,199
309	3,265	3,816	440A	872	1,854
310	8,601	7,717	440B	704	475
316	22,664	32,704	440C	2,809	1,782
321	39,650	14,054	442	438	404
347	15,097	35,982	443	9	8
403	12,638	7,204	446	3,585	3,192
405	3,082	2,843	All Other	28,739	39,184
406	2,944	2,101			
410	35,980	29,369		680,435	832,309

American Iron & Steel Institute

High Speed and Tool Steel Bars

(Excluding Hollow Drill Steel)
Shipments—Net Tons

CLASS A HIGH SPEED STEEL

Grade	C (Min.)	Cr — (Maximum) —	W	Mo	V	Co (Min.)	10 mos. 1951	12 mos. 1950
I	0.60	4.5	6.75	5.5	2.1 Max.	...	16,477	6,161
I-b	0.90	4.5	6.75	6.5	2.25 Min.	...	418	154
I-c	0.60	4.5	6.75	5.5	2.2 Max.	3.5	183	572
II	0.60	4.5	2.0	9.25	1.3 Max.	...	6,473	1,559
II-c	0.60	4.5	2.0	9.25	2.2 Max.	3.5	228	42
III	0.60	4.5		9.25	2.2 Max.	...	2,130	948
III-c	0.60	4.5		9.25	2.2 Max.	3.5	161	73
Total							26,070	9,509

CLASS B HIGH SPEED STEEL

Grade	C (Min.)	Cr	W	Mo	V	Co (Min.)	10 mos. 1951	12 mos. 1950
IV	0.55	4.5	19.0	...	1.3 Max.	...	5,716	6,823
IV-b	0.55	4.5	19.0	1.25	1.75 Min.	...	454	546
IV-c	0.55	4.5	22.0	1.25	2.2 Max.	3.5	751	1,026
Total							6,961	8,395

OTHER TOOL STEELS

		10 mos. 1951	12 mos. 1950
V	All hot-work steel	10,817	8,608
VI	High chromium (4% Cr minimum) die steels	10,156	7,168
VII	All other alloy tool steels	65,734	40,891
VIII	Carbon tool steels, excluding hollow drill steel	28,559	19,038
Total		115,266	75,705
Grand Total		148,297	93,609

American Iron & Steel Institute

Steel Forgings

Shipments for Sale—Net Tons

	Drop and Upset	Press and Open Hammer	Total
1951			
Jan.	108,842	29,571	138,413
Feb.	97,448	31,351	128,799
Mar.	118,039	42,878	160,917
Apr.	112,074	41,873	153,947
May†	117,475	59,798	177,273
June†	110,979	59,392	170,371
July†	95,275	52,044	147,319
Aug.†	103,962	54,011	157,973
Sept.†	97,326	52,410	149,736
Oct.†	130,675	60,808	191,483
Nov.†	....	....	....
Dec.	....	....	....
1950	1,089,515	270,638	1,360,153
Jan.	73,458	19,536	92,994
Feb.	73,440	19,107	92,547
Mar.	87,745	20,932	108,677
Apr.	80,950	18,243	99,193
May	93,459	20,198	113,657
June	96,061	21,272	117,333
July	79,081	13,848	94,929
Aug.	99,605	24,003	123,608
Sept.	97,753	24,655	122,408
Oct.	107,666	29,071	136,737
Nov.	102,511	27,775	130,286
Dec.	97,786	29,998	127,784
1949	866,444	272,184	1,138,628
1948	1,028,712	385,977	1,414,689
1947	972,082	361,649	1,333,731
1946	793,234	370,807	1,164,041

† Beginning with May, 1951, the Bureau of the Census broadened its coverage of forgings production.

U. S. Bureau of the Census

Distribution

METALWORKING FACTS AND FIGURES

FINISHED STEEL DISTRIBUTION

By Market Classifications

(All Grades, Net Tons)

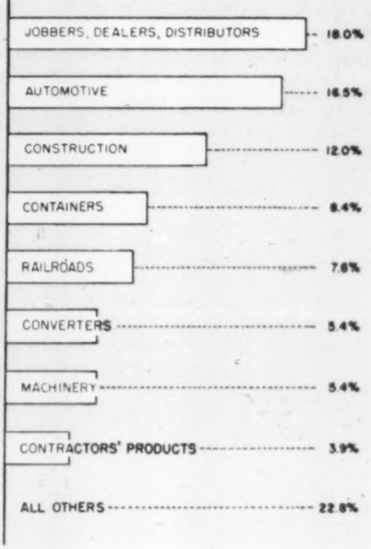
	12 mos. 1951*	12 mos. 1950	12 mos. 1949	12 mos. 1948
Jobbers, Dealers, Distributors	14,251,320	13,359,724	10,219,983	11,405,749
Automotive	13,063,710	14,472,707	10,962,894	10,220,982
Construction, including Maintenance	9,500,880	8,602,063	7,477,953	7,277,018
Containers	6,650,616	5,911,164	4,655,625	5,302,373
Rail Transportation	6,017,224	4,299,346	3,655,406	5,225,535
Converters and Processors	4,275,396	3,899,786	2,504,168	3,348,414
Machinery, Indus. Equip. & Tools	4,275,396	3,473,896	2,708,633	3,188,718
Contractors' Products	3,087,786	3,075,195	2,124,806	2,507,977
Export	2,612,742	2,566,473	3,517,971	3,244,888
Electrical Machinery and Equip.	2,058,524	1,836,632	1,209,027	1,594,700
Other Domestic & Commercial Equip.	2,058,524	1,804,449	1,325,940	1,713,806
Appliances	1,900,176	2,087,853	1,322,922	1,959,878
Agricultural	1,662,654	1,537,708	1,491,085	1,426,943
Bolts, Nuts, Rivets, Screws	1,583,480	1,410,011	874,594	1,284,653
Forgings (other than Automotive)	1,583,480	1,062,309	821,570	938,838
Unclassified	1,266,784	1,329,648	1,568,406	3,577,695
Ordnance, Other Military	1,029,262	194,614	81,150	56,029
Oil & Gas Drilling	870,914	620,413	600,205	684,478
Shipbuilding, Marine Equipment	870,914	327,413	668,694	649,613
Mining, Quarrying, Lumbering	395,870	289,302	271,872	329,090
Aircraft	158,348	51,566	41,096	35,761
Total	79,174,000	72,232,292	58,104,010	65,973,138

American Iron & Steel Institute

* Estimated by STEEL on basis of actual shipments in first 9 months.

WHERE THE STEEL GOES

1951 – ESTIMATED



DISTRIBUTION

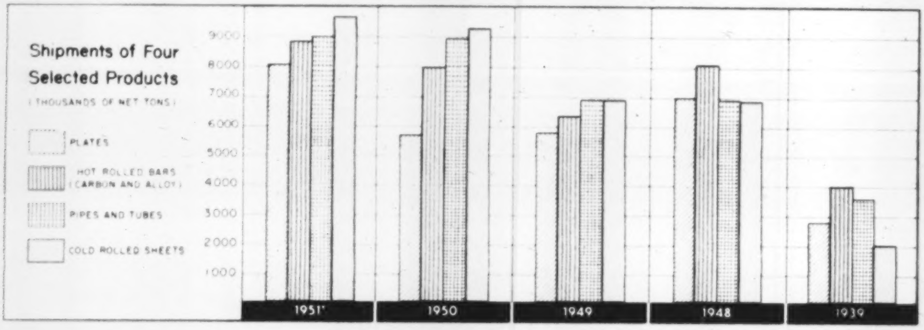
NET TONS

By Market Classifications	STAINLESS STEEL 9 mos. 1951	STAINLESS STEEL 12 mos. 1950	STAINLESS STEEL 12 mos. 1949	ALLOY STEEL (Other than Stainless) 9 mos. 1951	ALLOY STEEL 12 mos. 1950	ALLOY STEEL 12 mos. 1949	CARBON STEEL 9 mos. 1951	CARBON STEEL 12 mos. 1950	CARBON STEEL 12 mos. 1949
Converters and Processors	32,829	40,294	21,079	66,542	67,928	61,590	3,101,104	3,791,564	2,421,499
Forgings (Other than Automotive)	11,062	9,290	4,906	509,900	419,663	276,379	603,034	653,356	540,285
Bolts, Nuts, Rivets, Screws	5,010	4,272	2,317	78,780	78,304	38,869	1,096,684	1,327,435	833,408
Jobbers, Dealers, Distributors	88,709	108,320	51,533	305,890	330,157	262,647	10,227,351	12,921,247	9,905,803
Construction, including Maintenance	8,532	5,310	7,067	76,327	88,842	77,712	6,941,726	8,507,931	7,393,174
Contractors' Products	10,612	11,421	4,986	22,336	40,996	43,563	2,244,852	3,022,778	2,076,257
Automotive	65,036	81,800	53,359	1,452,580	1,901,472	1,410,692	8,308,314	12,489,435	9,498,843
Rail Transportation	3,654	3,824	3,936	186,737	166,493	124,049	4,293,450	4,129,029	3,527,421
Shipbuilding, Marine Equip.	974	1,167	653	18,954	18,357	23,832	619,691	307,893	644,209
Aircraft	23,810	11,942	9,048	44,932	27,732	20,896	41,932	11,857	11,152
Oil and Gas Drilling	1,240	880	199	112,164	140,369	112,601	503,853	479,195	487,405
Mining, Quarrying, Lumbering	504	401	428	19,682	18,297	21,312	254,807	270,604	250,132
Agricultural	206	277	270	37,419	50,531	37,580	1,214,080	1,486,900	1,453,235
Machinery, Indus. Equip. & Tools	33,316	27,240	18,337	497,086	528,078	373,855	2,579,752	2,918,578	2,316,441
Electrical Machinery and Equip.	13,079	17,906	4,348	403,411	498,011	315,723	1,112,792	1,320,715	888,956
Appliances, Utensils, Cutlery	36,721	45,747	27,289	29,226	43,942	22,906	1,371,876	1,998,164	1,272,727
Other Domestic & Commercial Equip.	11,434	10,271	5,569	20,159	24,571	31,299	1,524,503	1,769,607	1,289,072
Containers	2,128	4,516	3,149	14,045	16,906	15,096	4,918,755	5,889,742	4,637,390
Ordnance, Other Military	5,934	1,909	959	168,519	41,534	10,829	612,925	151,171	69,362
Unclassified	37,965	50,701	33,205	155,754	135,901	78,467	812,017	1,143,046	1,456,734
Export	6,013	11,892	15,040	73,459	87,248	100,919	1,851,523	2,467,333	3,402,012
Total	398,768	449,380	267,677	4,293,902	4,725,332	3,460,816	54,235,021	67,057,580	54,375,517

American Iron & Steel Institute

Steel Shipments

SHIPMENTS OF STEEL PRODUCTS



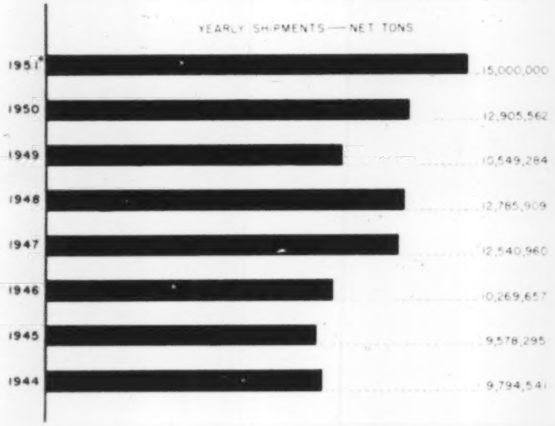
Steel Products—Net tons	Shipments	%	Shipments	%	Shipments	%	Shipments	%	Shipments	%
Ingots, blooms, slabs, billets, tube rounds, sheet and tin bars, etc.	3,562,830	4.5	3,122,156	4.3	2,261,285	3.9	3,150,754	4.8	1,305,866	3.7
Structural shapes (heavy)	4,908,788	6.2	4,197,653	5.8	3,669,503	6.3	4,255,355	6.5	2,544,515	7.3
Steel piling	395,870	0.5	342,277	0.5	301,824	0.5	299,537	0.5	171,428	0.5
Plates (sheared and universal)	8,075,748	10.2	5,677,094	7.9	5,759,065	9.9	7,000,199	10.6	2,793,798	8.0
Skelp	158,348	0.2	123,388	0.2	118,533	0.2	75,252	0.1	226,508	0.6
Rails—Standard (over 60 lb)	1,741,828	2.2	1,706,243	2.4	1,772,734	3.0	1,976,520	3.0	1,161,988	3.3
All other	158,348	0.2	116,389	0.2	117,154	0.2	214,880	0.3	125,109	0.4
Joint bars and tie plates	633,392	0.8	529,934	0.8	491,896	0.8	626,573	1.0	466,247	1.3
Track spikes	158,348	0.2	138,732	0.2	95,345	0.2	145,830	0.2	119,719	0.3
Hot-rolled bars—Carbon	...	...	...	...	...	...	6,196,444	9.4	3,292,876	9.4
Alloy	...	...	...	...	...	...	1,927,309	2.9	702,322	2.0
Total carbon and alloy	8,867,488	11.2	8,017,465	11.1	6,416,102	11.0	8,123,753	12.3	3,995,198	11.4
Reinforcing—New billet	...	...	...	...	...	...	1,329,945	2.0	1,038,949	3.0
Reinforcing—Rerolled	...	...	...	...	...	...	212,021	0.3	175,253	0.5
Reinforcing—Total	1,900,176	2.4	1,674,079	2.3	1,572,588	2.7	...	...	...	...
Cold-finished bars—Carbon	...	...	...	...	...	...	1,349,719	2.0	592,514	1.7
Alloy	...	...	...	...	...	...	244,248	0.4	66,384	0.2
Total carbon & alloy	1,900,176	2.4	1,624,845	2.2	1,213,052	2.1	1,593,967	2.4	658,898	1.9
Tool steel bars	158,348	0.2	89,863	0.1	57,395	0.1	88,376	0.1	45,117	0.1
Pipes and tubes—Total	9,025,836	11.4	8,953,840	12.3	6,935,220	12.0	6,881,549	10.4	3,506,582	10.0
Buttweld	...	...	...	...	...	...	2,045,361	3.1	952,974	2.7
Lapweld	...	...	...	...	...	...	339,633	0.5	358,919	1.0
Electricweld	...	...	...	...	...	...	1,572,139	2.4	267,312	0.8
Seamless	...	...	...	...	...	...	2,924,416	4.4	1,686,665	4.8
Conduit and miscellaneous	...	...	...	...	218,737	0.4	...	...	78,850	0.2
Mechanical and pressure tubing	1,266,784	1.6	992,690	1.3	617,663	1.1	...	...	160,862	0.5
Pipe—Standard	2,929,438	3.7	2,599,818	3.6	2,090,445	3.6	...	...	...	...
Pipe—Line	2,929,438	3.7	3,668,511	5.1	2,534,423	4.4	...	...	...	...
Pipe—Oil country goods	1,900,176	2.4	1,692,821	2.3	1,365,982	2.3	...	...	...	...
Tubes—Boiler	...	...	...	...	107,970	0.2	...	...	...	...
Wire rods	870,914	1.1	816,555	1.1	570,397	1.0	610,348	0.9	550,040	1.6
Wire—Drawn	3,246,134	4.1	2,867,476	4.0	2,138,878	3.7	2,673,276	4.1	1,354,992	3.9
Nails and staples	870,914	1.1	874,470	1.2	731,356	1.3	859,540	1.3	678,786	1.9
Barbed and twisted	237,522	0.3	237,604	0.3	215,047	0.4	254,629	0.4	231,021	0.7
Woven wire fence	395,870	0.5	483,920	0.7	358,162	0.6	399,457	0.6	273,596	0.8
Bale ties	79,174	0.1	83,831	0.1	42,828	0.1	113,892	0.2	59,547	0.1
All other wire products	...	...	...	...	...	...	...	...	5,766	...
Fence posts	...	...	...	...	...	...	...	...	60,439	0.1
Black plate—Total	1,029,262	1.3	562,077	0.8	452,041	0.8	...	...	...	...
Ordinary	...	...	...	...	...	...	821,398	1.3	269,341	0.8
Chemically treated	...	...	...	...	...	...	17,268	...		
Tin and terne plate—Hot dipped	1,741,828	2.2	1,911,568	2.7	1,699,355	2.9	2,167,912	3.3	2,561,451	7.3
Electrolytic	2,850,264	3.6	2,840,599	3.9	1,993,468	3.4	1,784,288	2.7		
Sheets—Hot-rolled	8,392,444	10.6	7,804,948	10.8	6,192,610	10.7	7,788,066	11.8	5,067,886	14.6
Cold-rolled	9,659,228	12.2	9,338,312	12.9	6,886,946	11.8	6,867,775	10.4	2,021,859	6.1
Galvanized	2,058,524	2.6	2,262,041	3.1	1,755,067	3.0	1,643,337	2.5	1,394,922	4.0
Long terne	...	...	...	...	151,118	0.3	...	...	...	...
Enameling	158,348	0.2	256,766	0.4	162,815	0.3	...	...	...	...
All other coated	237,522	0.3	237,941	0.3	...	...	...	...	...	...
Electrical (sheets and strip)	791,740	1.0	716,592	1.0	379,180	0.6	...	...	...	...
Strip—Hot-rolled	2,216,872	2.8	2,330,783	3.2	1,674,818	2.9	1,662,787	2.5	1,160,513	3.3
Cold-rolled	2,058,524	2.6	1,894,588	2.6	1,465,297	2.5	1,783,383	2.7	676,397	1.9
Wheels	395,870	0.5	268,662	0.4	285,733	0.5	337,376	0.5	150,750	0.4
Axles	237,522	0.3	130,601	0.2	159,628	0.3	215,906	0.3	73,970	0.2
All other	...	...	...	...	7,570	0.0	...	...	9,724	...
Total steel products	79,174,000	100.0	72,232,292	100.0	58,104,010	100.0	65,973,138	100.0	34,955,175	100.0

American Iron & Steel Institute

* Estimated

Castings

GRAY IRON CASTINGS



Shipments—Net Tons

	Miscel-laneous	Ingot Molds	Chilled Iron Railroad Car Wheels	Cast Iron Pressure Pipe & Fittings	Cast Iron Soil Pipe & Fittings	For Sale	For Own Use
1951							
10 Mos.	8,187,846	2,186,941	549,643	1,235,577	613,153	7,197,839	5,575,321
Jan.	875,437	228,824	56,046	131,779	72,225	762,407	601,904
Feb	811,724	193,648	49,423	117,141	62,290	684,928	549,298
Mar	920,802	231,853	68,282	144,620	74,592	818,473	621,676
Apr.	880,565	217,970	61,993	134,302	68,395	766,919	596,306
May	898,328	225,129	65,721	139,854	67,619	796,468	600,183
June	847,024	216,620	58,620	121,851	64,872	742,794	566,193
July	653,656	200,764	40,792	88,217	45,383	568,126	460,686
Aug.	779,838	222,721	50,127	115,284	50,862	697,952	520,880
Sept.	704,657	204,856	45,467	111,893	47,916	625,511	489,278
Oct.	815,815	244,556	53,172	130,636	58,999	734,261	568,917
Nov.	......	......	.....	......	.....	......	......
Dec.	......	......	.....	......	.....	......	......
1950	8,117,748	2,308,661	514,074	1,203,762	761,317	6,880,352	6,025,210
Jan.	573,743	188,152	34,254	64,095	53,077	449,577	463,744
Feb.	551,060	169,605	33,417	63,363	46,744	416,594	447,595
Mar.	635,403	170,082	44,898	89,264	56,135	500,195	496,587
Apr.	621,368	182,420	42,768	82,774	51,796	483,862	497,284
May	684,632	195,021	46,219	104,529	64,710	572,887	522,224
June	713,811	197,474	45,672	106,980	72,192	613,084	523,045
July	595,918	177,154	35,066	94,438	58,874	507,867	453,583
Aug.	747,046	199,770	52,508	131,127	71,118	677,134	524,435
Sept.	722,667	203,191	44,707	121,556	67,119	648,966	510,274
Oct.	792,764	220,821	46,516	119,106	75,695	700,512	554,389
Nov.	733,570	194,271	44,382	115,465	73,082	656,745	504,025
Dec.	745,766	210,700	43,667	111,066	70,775	652,929	529,045
1949	6,624,420	1,776,242	555,569	1,029,743	563,310	5,517,527	5,031,757
Jan.	635,530	193,859	51,991	100,468	58,495	573,164	467,179
Feb.	598,910	186,258	52,618	96,607	52,198	535,163	451,428
Mar.	651,763	205,628	64,361	110,942	42,010	567,041	507,663
Apr.	562,804	190,714	59,070	91,577	25,142	467,433	461,874
May	509,633	192,606	50,784	86,092	27,516	439,420	427,211
June	554,322	175,562	51,520	87,279	36,890	455,442	450,131
July	433,223	112,390	37,243	74,566	39,493	341,657	355,258
Aug.	557,503	136,858	43,651	79,544	54,457	445,981	426,032
Sept.	570,781	128,363	37,791	86,262	57,450	459,014	421,633
Oct.	539,262	7,407	33,762	79,003	56,251	397,939	317,746
Nov.	489,076	62,937	38,006	71,639	57,045	395,107	323,596
Dec.	521,613	183,660	34,772	65,764	56,363	440,166	422,006
1950	8,117,748	2,308,661	514,074	1,203,762	761,317	6,880,352	6,025,210
1949	6,624,420	1,776,242	555,569	1,029,743	563,310	5,517,527	5,031,757
1948	8,296,843	1,979,740	719,784	1,149,553	639,989	7,131,405	5,654,504
1947	8,306,793	1,873,376	752,976	1,031,626	577,189	7,181,299	5,359,661
1946	6,952,462	1,397,776	723,891	786,314	409,214	6,102,246	4,167,411
1945	6,062,476	1,810,562	899,561	602,663	203,033	5,923,201	3,655,094
1944	......	......	......	......	......	6,173,714	3,620,827

U. S. Bureau of the Census

DIE CASTINGS

Shipments—Thousands of Pounds

Copper and Copper-Base

	1951	1950	1949
Jan	1,107	1,021	832
Feb	1,092	947	772
Mar	1,214	1,123	863
Apr	978	966	722
May	1,006	1,076	733
June	1,145	1,165	678
July	873	941	469
Aug	1,081	1,159	588
Sept	921	1,081	685
Oct	751	1,203	751
Nov		1,325	838
Dec		1,217	886
Total		13,224	8,817

Yearly Totals

1950	13,224	1947	12,657
1949	8,817	1946	10,651
1948	12,672		

Aluminum and Aluminum-Base

	1951	1950	1949
Jan	12,641	9,030	8,490
Feb	12,852	8,831	7,795
Mar	12,677	10,844	7,999
Apr	12,079	10,795	6,876
May	11,692	11,799	5,984
June	10,850	12,173	6,241
July	8,693	9,943	5,167
Aug	9,526	12,207	6,108
Sept	9,730	13,594	7,602
Oct	10,297	15,408	8,885
Nov		15,715	8,324
Dec		14,322	8,405
Total		144,661	87,876

Yearly Totals

1950	144,661	1945	70,667
1949	87,876	1944	84,200
1948	118,738	1943	65,742
1947	110,538	1942	55,924
1946	73,702		

Zinc and Zinc-Base

	1951	1950	1949
Jan	40,872	36,856	32,366
Feb	38,764	32,962	28,226
Mar	43,986	42,614	29,127
Apr	43,346	40,090	27,386
May	43,917	47,029	28,261
June	41,172	48,289	32,162
July	33,950	41,924	25,542
Aug	37,129	46,589	34,990
Sept	31,386	48,712	35,460
Oct	36,148	50,583	36,183
Nov		48,597	31,028
Dec		47,618	34,134
Total		531,863	374,865

Lead and Lead-Base

	1951	1950	1949
Jan	1,419	659	1,019
Feb	1,118	665	705
Mar	1,782	847	418
Apr	2,482	930	348
May	1,912	982	476
June	1,663	1,094	606
July	1,327	1,045	600
Aug	1,555	1,629	979
Sept	1,576	1,479	1,319
Oct	1,497	1,666	1,278
Nov		1,395	800
Dec		1,109	553
Total		13,500	9,101

Yearly Totals

1950	13,500	1947	14,137
1949	9,101	1946	13,258
1948	14,877		

U. S. Bureau of the Census

Castings

STEEL CASTINGS

Shipments—Net Tons

	Carbon	Alloy, including Stainless	For Sale	For Own Use	Total
1951					
10 Mos.	1,337,069	421,887	1,252,179	506,777	1,758,956
Jan.	135,086	38,970	124,002	50,054	174,056
Feb.	126,293	37,683	117,156	46,820	163,976
Mar.	148,884	41,781	134,184	56,481	190,665
Apr.	139,948	41,960	129,059	52,849	181,908
May	143,201	45,756	130,826	58,130	188,956
June	141,538	42,886	131,219	53,205	184,424
July	111,964	35,287	100,141	47,110	147,251
Aug.	130,913	46,183	128,981	48,115	177,096
Sept.	120,632	40,063	116,658	44,037	160,695
Oct.	138,610	51,319	139,953	49,976	189,929
Nov.	......	......	......	......	......
Dec.	......	......	......	......	......
1950	1,066,062	395,605	1,042,884	418,783	1,461,667
Jan.	61,906	27,230	57,996	31,140	89,136
Feb.	64,585	27,655	62,045	30,195	92,240
Mar.	79,609	32,726	77,588	34,747	112,335
Apr.	75,990	31,139	75,133	31,996	107,129
May	84,841	32,932	83,845	33,928	117,773
June	96,365	34,732	94,637	36,460	131,097
July	70,122	28,147	68,874	29,395	98,269
Aug.	92,197	36,172	94,413	33,956	128,369
Sept.	98,523	36,051	96,738	37,836	134,574
Oct.	112,704	36,854	109,660	39,898	149,558
Nov.	110,476	35,453	108,263	37,666	145,929
Dec.	118,744	36,514	113,692	41,566	155,258
1949	923,168	327,292	865,297	385,163	1,250,460
Jan.	108,975	32,463	103,503	37,935	141,438
Feb.	104,461	31,228	99,425	36,264	135,689
Mar.	107,762	32,531	102,027	38,266	140,293
Apr.	90,779	30,091	83,277	37,593	120,870
May	85,145	21,804	75,537	31,412	106,949
June	87,616	29,017	84,112	32,521	116,633
July	54,434	24,040	50,124	28,350	78,474
Aug.	61,359	28,490	59,412	30,437	89,849
Sept.	60,978	26,139	55,853	31,264	87,117
Oct.	50,167	21,128	48,263	23,032	71,295
Nov.	52,650	24,170	50,685	26,135	76,820
Dec.	58,842	26,191	53,079	31,954	85,033
1948	1,367,708	392,324	1,335,295	424,737	1,760,032
1947	1,241,005	384,050	1,203,504	421,551	1,625,055
1946	1,112,243	319,806	1,043,358	388,691	1,432,049
1945	1,434,473	508,004	1,490,202	452,275	1,942,477
1944	1,825,130	620,291	1,843,386	602,035	2,445,421

U. S. Bureau of the Census

MALLEABLE IRON CASTINGS

Shipments—Net Tons

	For Sale	For Own Use	Total
1951			
10 Mos.	554,848	364,134	918,982
Jan.	54,817	37,691	92,508
Feb.	54,915	34,035	88,950
Mar.	60,265	41,402	101,667
Apr.	58,199	39,722	97,921
May	61,918	39,427	101,345
June	57,176	37,200	94,376
July	45,072	31,754	76,826
Aug.	57,164	33,563	90,727
Sept.	48,568	33,708	82,276
Oct.	56,754	35,632	92,386
Nov.			
Dec.			
1950	512,192	408,310	920,502
Jan.	32,918	29,956	62,874
Feb.	31,249	29,137	60,386
Mar.	38,639	27,620	66,259
Apr.	36,279	33,543	69,822
May	42,432	33,729	76,161
June	46,613	35,732	82,345
July	37,198	30,316	67,514
Aug.	50,019	36,002	86,021
Sept.	46,927	35,552	82,479
Oct.	50,157	39,811	89,968
Nov.	48,670	36,493	85,163
Dec.	51,091	40,419	91,510
1949	371,214	342,116	713,330
Jan.	38,040	33,836	71,876
Feb.	35,074	31,670	66,744
Mar.	38,143	33,909	72,052
Apr.	31,840	29,477	61,317
May	27,643	26,929	54,572
June	32,639	26,958	59,597
July	23,216	21,144	44,360
Aug.	30,327	27,794	58,121
Sept.	30,781	29,942	60,723
Oct.	28,582	28,568	57,150
Nov.	25,250	24,189	49,439
Dec.	29,679	27,700	57,379
1948	525,212	408,053	933,265
1947	513,228	381,826	895,054
1946	452,355	299,673	752,028
1945	520,887	269,844	790,731
1944	619,588	258,645	878,233
1943	653,884	190,755	844,639
1942	590,804	155,204	746,008
1941	619,365	212,808	832,173
1940	400,818	155,391	556,209
1939	331,421	134,647	466,068
1938	208,597	87,406	296,003
1937	420,937	175,685	596,622
1936	378,900	175,770	554,670
1935			455,208

U. S. Bureau of the Census

HIGH ALLOY CASTINGS

Estimated Production by All United States Producers—Pounds

	Heat Resistant	Corrosion Resistant	Abrasion Resistant	Totals
1951†	....	....	....	72,550,000
1st Qtr.	8,871,500	7,270,200	1,445,300	17,587,000
2nd Qtr.	10,631,500	7,123,700	1,601,500	19,356,700
3rd Qtr.	9,872,200	6,967,500	772,400	17,612,100
4th Qtr.	....	....	....	....
1950	26,894,000	19,033,200	3,321,200	49,248,400
1st Qtr.	5,246,500	3,675,600	395,600	9,317,700
2nd Qtr.	6,430,000	4,093,200	681,200	11,204,400
3rd Qtr.	6,959,400	4,908,900	838,600	12,706,900
4th Qtr.	8,258,100	6,355,500	1,405,800	16,019,400

Alloy Casting Institute

	Heat Resistant	Corrosion Resistant	Abrasion Resistant	Totals
1949	19,791,700	12,997,100	1,500,700	34,289,500
1948	24,030,400	16,285,200	2,525,300	42,840,900
1947	21,505,100	16,346,900	1,534,500	39,386,500
1946	20,398,800	15,150,400	1,860,700	37,409,900
1945	23,002,700	12,276,200	1,482,000	36,760,900
1944	27,698,800	9,662,100	1,365,700	38,726,600
1943	33,245,400	10,726,900	2,116,900	46,089,200
1942	31,020,900	10,490,500	1,212,600	42,724,000
1941	21,713,900	9,679,600	1,511,500	32,905,000
1940	11,978,900	4,576,300	837,400	17,392,600
1939	8,793,500	2,812,600	573,500	12,179,600

† Preliminary

NONFERROUS CASTINGS

Zinc and Zinc-Base Alloy Castings

Shipments—Thousands of Pounds

	Die	All Other	Total
1951			
10 Mos.	390,670	1,841	392,511
Jan.	40,872	294	41,166
Feb.	38,764	200	38,964
Mar.	43,986	232	44,218
Apr.	43,346	167	43,513
May	43,917	270	44,187
June	41,172	169	41,341
July	33,950	114	34,064
Aug.	37,129	192	37,321
Sept.	31,386	121	31,507
Oct.	36,148	82	36,230
Nov.			
Dec.			
1950	531,863	4,535	536,398
Jan.	36,856	269	37,125
Feb.	32,962	409	33,371
Mar.	42,614	436	43,050
Apr.	40,090	310	40,400
May	47,029	425	47,454
June	48,289	529	48,818
July	41,924	264	42,188
Aug.	46,589	623	47,212
Sept.	48,712	367	49,079
Oct.	50,583	448	51,031
Nov.	48,597	255	48,852
Dec.	47,618	200	47,818
1949	374,865	3,312	378,177
Jan.	32,366	199	32,565
Feb.	28,226	185	28,411
Mar.	29,127	273	29,400
Apr.	27,386	268	27,654
May	28,261	167	28,428
June	32,162	236	32,398
July	25,542	159	25,701
Aug.	34,990	289	35,279
Sept.	35,460	376	35,836
Oct.	36,183	447	36,630
Nov.	31,028	411	31,439
Dec.	34,134	302	34,436
1948	439,183	5,771	444,954
1947	429,535	6,873	436,408

U. S. Bureau of the Census

Magnesium and Magnesium-Base Alloy Castings

Shipments—Thousands of Pounds

	1951	1950	1949	1948	1947
Jan.	1,840	814	822	659	863
Feb.	1,907	735	813	655	768
Mar.	2,156	903	879	704	717
Apr.	2,267	799	726	673	684
May	2,334	810	778	622	628
June	1,758	758	799	709	613
July	1,676	727	689	554	490
Aug.	2,270	1,147	753	703	523
Sept.	2,010	1,231	727	745	518
Oct.	2,371	1,354	796	708	616
Nov.		1,508	801	728	602
Dec.		1,528	781	754	669

Yearly Shipments

1950	12,314	1945	83,753
1949	9,364	1944	201,487
1948	8,214	1943	143,326
1947	7,691	1942	44,546
1946	8,472		

U. S. Bureau of the Census

Copper and Copper-Base Alloy Castings

Shipments—Thousands of Pounds

	Sand	Permanent Mold	Die	Other	Total
1951					
10 Mos.	870,625	55,391	10,168	30,756	966,940
Jan.	92,171	6,363	1,107	3,002	102,643
Feb.	87,667	5,427	1,092	2,760	96,946
Mar.	100,221	6,405	1,214	3,047	110,887
Apr.	91,852	5,802	978	2,874	101,506
May	95,049	5,986	1,006	3,397	105,438
June	88,818	5,358	1,145	3,238	98,559
July	69,334	4,064	873	2,280	76,551
Aug.	84,720	5,097	1,061	3,545	94,443
Sept.	76,304	5,161	921	3,047	85,433
Oct.	84,489	5,728	751	3,566	94,534
Nov.	.....	....	....	....	......
Dec.	.....	....	....	....	......
1950	925,787	52,756	13,224	30,816	1,022,583
Jan.	58,878	3,440	1,021	2,094	65,433
Feb.	60,257	3,626	947	2,046	66,876
Mar.	71,943	4,693	1,123	2,554	80,313
Apr.	64,655	3,848	966	2,731	72,200
May	78,577	3,751	1,076	2,676	86,080
June	74,982	3,896	1,165	2,972	83,015
July	62,384	3,789	941	1,889	69,003
Aug.	85,969	4,258	1,159	2,648	94,034
Sept.	87,111	4,650	1,061	2,819	95,641
Oct.	96,911	5,064	1,203	2,568	105,746
Nov.	93,607	5,776	1,325	2,986	103,694
Dec.	90,513	5,985	1,217	2,833	100,548
1950	925,787	52,756	13,224	30,816	1,022,583
1949	654,444	37,311	8,817	23,481	724,053
1948	930,790	59,009	12,672	28,354	1,030,825
1947	960,732	51,139	12,657	27,214	1,051,742
1946	974,019	56,071	10,651	24,855	1,065,596
1945	......	.....	.....	.....	1,008,000
1944	......	.....	.....	.....	1,446,200
1943	......	.....	.....	.....	1,522,000
1942	......	.....	.....	.....	1,365,800

U. S. Bureau of the Census

Aluminum and Aluminum-Base Alloy Castings

Shipments—Thousands of Pounds

	Sand	Permanent Mold	Die	Other	Total
1951					
10 Mos.	139,416	114,055	111,037	8,375	372,883
Jan.	14,401	14,554	12,641	942	42,538
Feb.	14,106	13,082	12,852	745	40,785
Mar.	15,900	12,771	12,677	856	42,204
Apr.	14,455	12,901	12,079	807	40,242
May	14,798	13,400	11,692	597	40,487
June	13,853	10,323	10,850	935	35,961
July	10,739	7,142	8,693	852	27,426
Aug.	14,128	10,922	9,526	955	35,531
Sept.	13,086	8,829	9,730	842	32,487
Oct.	13,950	10,131	10,297	844	35,222
Nov.	.....	.....	.....	...	.....
Dec.	.....	.....	.....	...	.....
1950	154,013	143,821	144,661	10,115	452,610
Jan.	9,646	9,400	9,030	703	28,779
Feb.	10,171	9,358	8,831	507	28,867
Mar.	13,035	11,094	10,844	846	35,819
Apr.	11,091	10,656	10,795	814	33,356
May	11,528	11,928	11,799	778	36,033
June	12,679	11,825	12,173	925	37,602
July	9,609	9,808	9,943	788	30,148
Aug.	14,117	12,682	12,207	846	39,852
Sept.	14,369	13,085	13,594	1,013	42,061
Oct.	15,994	14,893	15,408	983	47,278
Nov.	16,099	14,040	15,715	962	46,816
Dec.	15,675	15,052	14,322	950	45,999
1950	154,013	143,821	144,661	10,115	452,610
1949	106,825	102,908	87,876	6,864	304,473
1948	139,781	161,334	118,738	4,637	424,490
1947	155,112	174,515	110,538	1,831	441,996
1946	160,845	153,138	73,702	1,026	388,711
1945	213,892	108,259	70,667	2,189	395,007
1944	321,200	106,200	84,200	2,800	514,400
1943	304,118	89,675	65,742	n.a.	459,535
1942	207,488	60,643	55,924	n.a.	324,065

U. S. Bureau of the Census

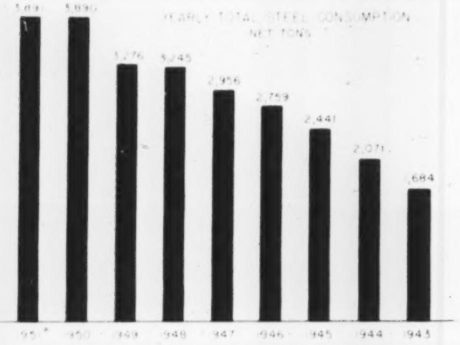
n.a.=Not available

Containers & Closures

METALWORKING FACTS AND FIGURES

METAL CANS

Shipments in Terms of Tons of Steel Consumed



	Food Cans	Nonfood Cans	Total	For Sale
1951				
10 Mos.	2,260,669	1,043,103	3,303,772	2,874,264
Jan.	160,492	111,290	271,782	234,285
Feb.	148,689	90,854	239,543	203,920
Mar.	164,956	103,066	268,022	224,124
Apr.	169,462	106,683	276,145	234,605
May	206,185	102,042	308,227	259,347
June	218,700	90,513	309,213	266,927
July	263,683	92,591	356,274	318,208
Aug.	367,257	115,931	483,188	428,044
Sept.	306,610	110,768	417,378	371,686
Oct.	254,635	119,365	374,000	333,018
Nov.	......	......	......	......
Dec.	......	......	......	......
1950	2,549,223	1,340,928	3,890,151	3,420,369
Jan.	136,899	72,288	209,187	176,582
Feb.	121,128	77,151	198,279	163,010
Mar.	138,019	98,394	236,413	192,993
Apr.	130,753	93,450	224,203	187,986
May	164,147	118,776	282,923	241,985
June	228,767	127,350	356,117	312,661
July	264,360	132,387	396,747	364,570
Aug.	395,230	156,196	551,426	498,344
Sept.	310,916	120,245	431,161	382,891
Oct.	230,772	119,086	349,858	313,218
Nov.	192,709	108,641	301,350	265,628
Dec.	235,523	116,964	352,487	320,501
1949	2,261,470	1,015,448	3,276,918	2,845,702
Jan.	119,810	66,462	186,272	157,631
Feb.	126,377	64,378	190,755	163,389
Mar.	131,004	77,184	208,188	172,320
Apr.	126,898	77,455	204,353	169,194
May	147,808	82,359	230,167	189,024
June	208,633	95,288	303,921	259,026
July	219,067	95,305	314,372	282,977
Aug.	383,603	106,191	489,794	444,976
Sept.	312,538	104,436	416,974	371,691
Oct.	188,092	97,552	285,644	252,522
Nov.	150,987	76,372	227,359	198,034
Dec.	146,653	72,466	219,119	184,918
1948	2,317,487	927,658	3,245,145	2,771,104
1947	2,146,601	809,515	2,956,116	2,499,621
1946	2,305,359	454,160	2,759,519	2,348,681
1945	2,030,277	411,297	2,441,574	*2,275,438
1944	1,827,038	244,556	2,071,594	*1,760,855
1943	1,556,512	127,956	1,684,468	*1,421,798

U. S. Bureau of the Census

* Estimated

Commercial Closures

Production—In Thousands

	Metal Caps	Plastic Caps†
1951		
10 Mos.	10,258,000	2,448,695
Jan.	1,213,055	271,585
Feb.	1,104,535	238,973
Mar.	1,294,349	241,504
Apr.	1,249,110	236,318
May	1,157,991	246,445
June	1,069,437	243,997
July	856,842	211,060
Aug.	868,413	250,015
Sept.	695,537	231,283
Oct.	748,751	277,515
Nov.		
Dec.		
1950	11,721,611	2,558,088
Jan.	778,887	171,796
Feb.	743,543	164,564
Mar.	856,056	204,545
Apr.	776,015	179,993
May	895,729	192,381
June	918,102	186,555
July	936,150	180,395
Aug.	1,264,351	255,827
Sept.	1,178,234	272,590
Oct.	1,244,511	275,439
Nov.	1,082,526	247,003
Dec.	1,047,507	227,000
1949	8,109,483	1,951,992
Jan.	737,852	204,964
Feb.	664,739	167,978
Mar.	736,570	173,086
Apr.	627,327	140,667
May	606,334	130,642
June	645,873	133,110
July	625,153	120,997
Aug.	760,942	159,075
Sept.	744,039	166,099
Oct.	687,993	185,539
Nov.	610,045	201,075
Dec.	662,616	168,760
1948	8,784,758	1,994,976
1947	8,814,618	2,230,166

† Not including caps for collapsible tubes.
U. S. Bureau of the Census

Tin Mill Products Consumed in Producing Closures

Consumption in Terms of Base Boxes

	Commercial Metal Caps	Crowns	Home Canning Closures
1951			
10 Mos.	2,075,943	2,879,288	598,034
Jan.	259,506	303,542	54,992
Feb.	228,664	277,550	59,733
Mar.	261,904	329,994	66,436
Apr.	250,585	308,918	73,191
May	238,090	295,306	90,855
June	202,553	278,783	88,773
July	190,317	268,113	57,636
Aug.	160,024	331,397	35,232
Sept.	133,098	243,180	39,772
Oct.	151,202	242,505	31,414
Nov.			
Dec.			
1950	2,603,125	3,400,418	
Jan.	176,744	211,207	
Feb.	178,458	215,116	
Mar.	215,016	271,764	
Apr.	193,599	253,474	
May	209,631	300,942	
June	223,290	329,706	
July	226,930	336,233	
Aug.	248,048	352,812	
Sept.	236,056	296,769	
Oct.	266,665	281,112	
Nov.	219,925	286,271	
Dec.	208,763	265,012	
1949	1,957,495	2,793,078	
Jan.	169,817	234,053	
Feb.	153,450	222,661	
Mar.	169,639	249,402	
Apr.	152,739	228,145	
May	153,421	229,390	
June	159,443	272,508	
July	152,095	263,871	
Aug.	177,073	288,611	
Sept.	170,744	250,789	
Oct.	181,909	197,352	
Nov.	167,866	191,286	
Dec.	149,299	165,010	
1948	2,128,660	3,261,749	

U. S. Bureau of the Census

Heavy Steel Barrels and Drums

Shipments for Sale—Number of Units

	1951	1950	1949
Jan	2,765,782	1,634,847	2,065,302
Feb	2,312,972	1,757,558	1,801,427
Mar	2,761,637	2,095,076	1,917,029
Apr	2,383,932	1,720,615	1,744,641
May	2,605,254	1,967,400	1,921,169
June	2,631,655	2,088,847	2,086,560
July	2,365,606	2,127,548	1,832,862
Aug	2,780,997	2,703,539	1,989,955
Sept	2,321,837	2,435,257	2,419,428
Oct	2,510,655	2,517,389	1,693,792
Nov		2,588,112	1,681,785
Dec		2,604,360	1,955,688

YEARLY TOTALS

1950	26,240,548	1942	21,234,721
1949	23,109,638	1941	18,332,143
1948	27,069,717	1940	13,556,443
1947	27,061,963	1939	12,158,445
1946	22,729,346	1938	8,550,299
1945	22,251,101	1937	9,869,212
1944	19,931,227	1936	8,600,493
1943	27,219,206		

Light Steel Barrels and Drums

Shipments for Sale—Number of Units

	1951	1950	1949
Jan	765,395	513,424	508,934
Feb	641,537	532,975	442,635
Mar	747,745	580,987	429,751
Apr	695,253	521,607	447,014
May	817,546	646,127	476,101
June	781,015	713,431	558,392
July	684,319	690,365	515,359
Aug	724,636	790,923	574,155
Sept	608,393	675,801	576,457
Oct	630,830	722,732	518,308
Nov		763,928	531,476
Dec		664,235	501,331

YEARLY TOTALS

1950	7,816,535	1942	4,541,108
1949	6,079,913	1941	3,757,565
1948	7,346,312	1940	2,805,284
1947	6,032,304	1939	2,592,129
1946	6,432,138	1938	1,964,951
1945	6,564,746	1937	2,145,766
1944	5,173,000	1936	1,904,195
1943	3,941,426		

Steel Shipping Packages, Kegs and Pails

Shipments for Sale—Number of Units

	1951	1950	1949
Jan	5,956,581	4,381,331	3,599,421
Feb	5,448,459	3,902,982	3,512,127
Mar	6,874,845	4,819,030	3,861,869
Apr	6,875,025	4,643,423	3,871,620
May	7,046,989	4,882,519	4,326,836
June	7,100,946	6,017,088	4,499,699
July	6,532,309	5,554,599	4,392,559
Aug	7,058,276	6,804,567	5,375,213
Sept	5,679,750	6,205,583	5,531,939
Oct	5,626,639	6,448,072	4,938,461
Nov		6,349,589	4,292,483
Dec		6,119,919	4,558,943

YEARLY TOTALS

1950	66,128,702	1947	57,581,113
1949	52,761,170	1946	51,808,792
1948	57,254,935	1945	57,698,050

U. S. Bureau of the Census

STEEL & IRON REQUIRED FOR MODERN-DAY PRODUCTS

PRODUCT	STEEL LB	IRON LB
Automobile	3,545	
Combine, Grain	5,579	1,251
Freight Car:		
Box (50-ton capacity)	35,540	6,000
Covered Hopper (70-ton capacity)	52,940	
Flat (50-ton capacity)	41,660	6,000
Hopper (50-ton capacity)	35,920	6,000
Ore (70-ton capacity)	42,300	
Refrigerator (40-ton capacity)	38,340	5,600
Hay Baler, Pickup type	2,115	1,602
House, Six-Room (Total)	8,482	
Bathroom	300	
Conduit	140	
Doors, Steel	160	
Flashing & miscellaneous sheets	200	
Frames and sills	480	
Gutters and downspouts	475	
Hardware	90	
Heating equipment	640	
Kitchen	800	
Lath	1,800	
Laundry tubs	10	
Nails and wire	600	
Pipe, Gas, Water and Heating	1,200	
Radiator grilles	75	
Screen	32	
Structural shapes and columns	680	
Windows	800	
Lathe, Turret	3,856	4,200
Lawn Mower	28	
Locomotive, Diesel-Electric	191,000	9,700
Piano	28	194
Printing Press, Four-Color Sheet Fed Gravure	53,400	57,500
Refrigerator	172	
Ship, Passenger (S. S. Independence)	31,952,000†	
Sleeping Car, Railroad (21-Roomette)	115,662†	
Tractor, Farm	1,543	
Truck, Railroad Freight Car	6,783	85
Truck, Railroad Passenger Car	18,236	224
Washing Machine	38	

American Iron & Steel Institute

† Steel and iron combined.

CROWNS

Production—In Gross

	1951	1950	1949
Jan.	30,924,924	21,364,828	23,823,597
Feb.	29,040,169	22,066,480	22,315,996
Mar.	34,005,978	26,280,833	25,546,044
Apr.	31,453,286	25,353,208	23,408,437
May	30,282,249	30,530,557	23,422,171
June	28,460,663	33,036,101	27,559,101
July	26,860,596	33,835,743	26,984,077
Aug.	33,637,583	36,612,817	29,708,968
Sept.	24,691,864	30,290,839	25,511,477
Oct.	24,625,215	28,757,797	19,936,206
Nov.	....	29,259,860	19,554,114
Dec.	....	26,807,122	16,767,308
Total	....	344,196,185	284,537,496

YEARLY TOTALS

1948..........333,448,503 1947..........331,338,274

U. S. Bureau of the Census

Prices

METALWORKING FACTS AND FIGURES

Beehive Metallurgical Coke

Average Price—Net Ton

	1951	1950	1949	1948
Connellsville furnace	$14.75	$14.06	$13.79	$13.55
Connellsville foundry	17.50	15.88	16.27	15.50
New River foundry	20.70	18.83	17.35	14.98
Wise county foundry	15.95	15.83	15.35	13.75
Wise county furnace	15.20	15.08	14.60	13.67

Oven Foundry Coke

Average Price—Net Ton

Ovens	1951	1950	1949	1948
Kearny N. J.	$22.75	$22.18	$21.98	$20.47
Milwaukee	23.75	21.18	20.94	20.13
Chicago	22.83	22.00	20.19	19.38

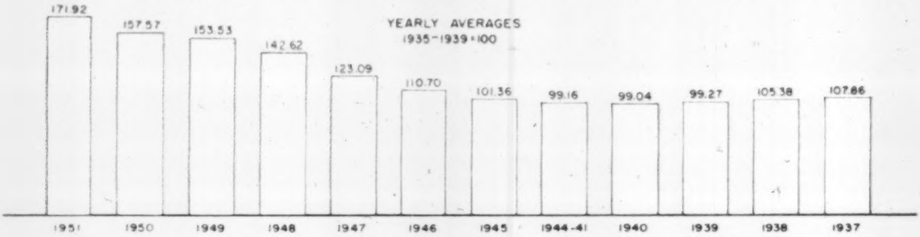
Lake Superior Iron Ore

(Per gross ton; 51½% iron)

	1951	1950	1949	1948
Bessemer Old Range	$8.70	$8.10	$7.60	$6.60
Bessemer Mesabi	8.45	7.85	7.35	6.35
Nonbessemer Old Range	8.55	7.95	7.45	6.45
Nonbessemer Mesabi	8.30	7.70	7.20	6.20
High Phosphorus	8.30	7.70	7.20	6.20

FINISHED STEEL—WEIGHTED PRICE COMPOSITE

(Based on average shipments and prices of the following products during 5-year base period 1935-1939: Structural shapes, plates, rails, hot-rolled and cold-finished bars, pipe, wire, nails, tin plate, hot and cold-rolled sheets, galvanized sheets, hot and cold-rolled strip)



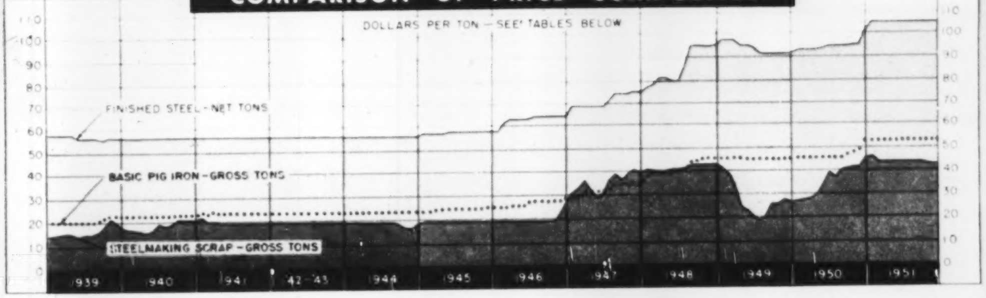
	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Avg.
1951	171.92	171.92	171.92	171.92	171.92	171.92	171.92	171.92	171.92	171.92	171.92	171.92	171.92
1950	156.13	156.13	156.13	156.13	156.13	156.54	156.69	156.95	156.99	157.53	157.76	167.87	157.57
1949	155.06	155.06	154.85	154.01	152.90	152.90	152.80	152.52	152.52	152.52	152.52	154.75	153.53
1948	132.93	134.56	135.91	135.91	135.02	134.56	143.08	151.99	151.86	151.86	151.86	151.86	142.62
1947	117.90	118.67	118.67	118.67	118.67	118.67	120.39	128.96	128.96	128.96	129.28	129.28	123.09
1946	101.87	106.82	111.62	111.62	111.62	111.86	112.04	112.04	112.04	112.04	112.04	112.82	110.70
1945	100.32	100.65	100.65	100.65	101.10	101.78	101.78	101.85	101.87	101.87	101.87	101.87	101.36
1944	99.16	99.16	99.16	99.16	99.16	99.16	99.16	99.16	99.16	99.16	99.16	99.16	99.16
1943	99.16	99.16	99.16	99.16	99.16	99.16	99.16	99.16	99.16	99.16	99.16	99.16	99.16
1942	99.16	99.16	99.16	99.16	99.16	99.16	99.16	99.16	99.16	99.16	99.16	99.16	99.16
1941	99.16	99.16	99.16	99.16	99.16	99.16	99.16	99.16	99.16	99.16	99.16	99.16	99.16
1940	99.16	99.16	99.16	97.75	99.16	99.16	99.16	99.16	99.16	99.16	99.16	99.16	99.04
1939	100.50	100.50	100.50	100.50	99.07	98.46	98.42	98.42	98.42	98.54	98.78	99.16	99.27
1938	109.94	109.73	109.65	109.65	109.65	107.84	101.84	101.84	101.78	101.31	100.83	100.50	105.38
1937	98.44	98.49	108.25	109.60	109.94	109.94	109.94	109.94	109.94	109.94	109.94	109.94	107.86
1936	94.00	94.00	92.03	91.62	91.62	91.62	94.09	94.09	93.96	94.78	94.87	96.94	93.64

FINISHED STEEL—ANNUAL PRICE AVERAGES

(Per net ton, Pittsburgh)

	SHEETS			STRIP		Tin	BARS				Basic	Standard
	H.R.	C.R.	Gal.	H.R.	C.R.	Plate	H.R.	C.F.	Plates	Shapes	Wire	Nails
1951	$73.00	$87.00	$96.00	$77.60	$101.60	$174.00	$74.00	$91.00	$74.00	$73.00	$98.60	$120.00
1950	67.50	82.42	88.67	68.33	86.29	150.00	69.42	83.29	70.33	68.42	91.13	107.67
1949	65.22	80.08	88.00	67.75	84.33	155.00	67.55	80.04	68.75	65.24	84.06	105.92
1948	60.17	74.83	82.80	62.40	80.36	135.75	62.84	75.63	63.84	60.17	80.10	107.33
1947	52.60	67.03	74.05	52.60	67.03	116.00	54.60	67.03	55.53	52.53	70.67	84.44
1946	48.03	64.80	79.50	47.33	60.56	104.38	49.46	61.21	49.38	46.38	60.25	69.61
1945	43.92	61.00	73.50	42.00	56.00	100.00	44.25	53.83	44.50	42.00	53.83	57.08
1944	42.00	61.00	70.00	42.00	56.00	100.00	43.00	53.00	42.00	42.00	52.00	51.00
1943	42.00	61.00	70.00	42.00	56.00	100.00	43.00	53.00	42.00	42.00	52.00	51.00
1942	42.00	61.00	70.00	42.00	56.00	100.00	43.00	53.00	42.00	42.00	52.00	51.00
1941	42.00	61.00	70.00	42.00	56.00	100.00	43.00	53.00	42.00	42.00	52.00	51.00
1940	41.80	60.80	70.00	41.75	55.75	100.00	43.00	53.00	42.00	42.00	52.00	51.00
1939	41.25	62.08	70.00	41.25	57.08	100.00	43.75	53.33	42.00	42.00	52.00	49.17
1938	45.42	66.67	72.92	45.25	61.08	106.00	47.00	56.00	43.50	43.50	55.00	52.00
1937	47.08	69.92	74.50	47.08	62.75	104.38	48.08	56.75	44.25	44.25	56.92	53.25
1936	38.25	60.00	63.25	38.25	52.33	105.00	38.50	44.42	37.00	37.00	48.17	42.83
1935	37.00	59.00	62.00	37.00	52.00	105.00	36.33	40.00	36.00	36.00	46.00	50.58
1934	37.08	58.75	61.25	37.17	51.75	106.00	36.17	42.00	35.67	35.67	45.42	50.58
1933	33.17	51.83	54.92	31.83	42.17	88.67	32.75	36.08	32.17	32.50	42.25	39.92
1932	34.08	55.17	56.33	28.92	39.75	93.75	31.67	35.75	31.67	31.67	44.00	39.00
1931	37.25	62.83	57.58	30.58	43.33	98.75	32.50	41.67	32.33	32.08	44.00	37.75
1930	40.17	73.00	63.00	33.67	49.33	103.75	34.42	41.83	34.17	34.17	46.67	42.50
1929	43.33	81.58	71.33	37.75	55.33	107.00	38.50	45.25	38.56	38.58	49.42	51.58
1928	40.75	80.67	71.75	36.92	56.83	105.25	37.50	44.00	37.50	37.50	49.00	51.58

COMPARISON OF PRICE COMPOSITES



FINISHED STEEL—ARITHMETICAL PRICE COMPOSITE

(In dollars per net ton, computed from industry-wide prices on carbon steel: Hot-rolled sheets, cold-rolled sheets, cold-rolled strip, hot-rolled bars, plates, structural shapes, basic wire, standard nails, tin plate, and standard and line pipe. Based on basing point prices through June, 1948; mill prices for subsequent months.)

	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Avg.
1951	$106.32	$106.32	$106.32	$106.32	$106.32	$106.32	$106.32	$106.32	$106.32	$106.32	$106.32	$106.32	$106.32
1950	92.92	93.09	93.18	93.19	93.65	94.35	94.36	94.44	94.50	94.91	95.09	100.76	94.54
1949	97.75	97.77	97.17	94.18	93.36	92.06	91.82	91.62	91.55	91.62	91.64	91.89	93.54
1948	78.26	79.86	81.14	81.14	80.27	80.27	86.18	95.05	95.05	95.05	95.16	95.50	86.91
1947	69.59	69.82	69.82	69.82	69.82	69.82	70.80	75.41	75.41	75.41	76.09	76.15	72.33
1946	58.27	60.91	63.54	63.54	63.54	64.09	64.45	64.45	64.45	64.45	64.45	64.75	63.41
1945	57.35	57.55	57.55	57.55	57.73	58.27	58.27	58.27	58.27	58.27	58.27	58.27	57.97
1944	56.73	56.73	56.73	56.73	56.73	56.73	56.73	56.73	56.73	56.73	56.73	56.73	56.73
1943	56.73	56.73	56.73	56.73	56.73	56.73	56.73	56.73	56.73	56.73	56.73	56.73	56.73
1942	56.73	56.73	56.73	56.73	56.73	56.73	56.73	56.73	56.73	56.73	56.73	56.73	56.73
1941	56.73	56.73	56.73	56.73	56.73	56.73	56.73	56.73	56.73	56.73	56.73	56.73	56.73
1940	56.73	56.73	56.73	56.08	56.73	56.73	56.73	56.73	56.73	56.73	56.73	56.73	56.68
1939	57.36	57.36	57.36	57.36	56.74	56.36	56.29	56.27	56.27	56.49	56.54	56.73	56.76

BASIC PIG IRON PRICE COMPOSITE

Average of basic pig iron prices (per gross ton) at Bethlehem, Birmingham, Buffalo, Chicago, Cleveland, Pittsburgh, Granite City, Youngstown.

	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Avg.
1951	$52.16	$52.16	$52.16	$52.16	$52.16	$52.16	$52.16	$52.16	$52.16	$52.16	$52.16	$52.16	$52.16
1950	45.70	45.97	45.97	45.97	45.97	45.97	45.97	45.97	47.08	47.98	49.04	52.16	46.98
1949	46.26	46.22	46.22	46.16	45.66	45.60	45.60	45.60	45.60	45.60	45.60	45.60	45.81
1948	38.50	39.30	39.34	39.21	39.66	40.49	41.42	44.12	44.62	46.19	46.29	46.29	42.12
1947	29.56	29.59	32.40	32.49	32.49	32.49	33.82	36.06	36.14	36.18	36.38	36.31	33.66
1946	24.75	24.75	25.13	25.50	25.50	27.50	27.50	27.50	27.50	27.50	27.50	29.10	26.64
1945	23.00	23.50	24.00	24.00	24.00	24.00	24.00	24.00	24.00	24.19	24.75	24.75	24.01
1944	23.00	23.00	23.00	23.00	23.00	23.00	23.00	23.00	23.00	23.00	23.00	23.00	23.00
1943	23.00	23.00	23.00	23.00	23.00	23.00	23.00	23.00	23.00	23.00	23.00	23.00	23.00
1942	23.00	23.00	23.00	23.00	23.00	23.00	23.00	23.00	23.00	23.00	23.00	23.00	23.00
1941	22.80	22.95	23.05	23.05	23.05	23.05	23.05	23.05	23.05	23.05	23.05	23.05	23.02
1940	22.05	22.05	22.05	22.05	22.05	22.05	22.05	22.05	22.05	22.05	22.05	22.32	22.07
1939	20.05	20.05	20.05	20.05	20.05	20.05	20.05	20.05	21.05	22.05	22.05	22.05	20.68

MALLEABLE PIG IRON COMPOSITE

Average of malleable pig iron prices (per gross ton) at Bethlehem, Buffalo, Chicago, Cleveland, Pittsburgh, Granite City, Youngstown.

	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Avg.
1951	$53.27	$53.27	$53.27	$53.27	$53.27	$53.27	$53.27	$53.27	$53.27	$53.27	$53.27	$53.27	$53.27
1950	47.27	47.27	47.27	47.27	47.27	47.27	47.33	47.49	48.15	49.46	50.27	53.27	48.30
1949	47.39	47.34	47.34	47.31	47.27	47.27	47.27	47.27	47.27	47.27	47.27	47.27	47.30
1948	39.58	40.39	40.45	40.29	40.70	41.54	42.32	44.87	45.30	47.20	47.41	47.41	43.12
1947	30.79	30.79	33.50	33.71	33.71	33.71	34.94	37.07	37.16	37.19	37.49	37.40	34.79
1946	26.04	26.04	26.41	26.79	26.79	28.79	28.79	28.79	28.79	28.79	28.79	30.36	27.93
1945	24.29	24.79	25.29	25.29	25.29	25.29	25.29	25.29	25.29	25.48	26.04	26.04	25.31
1944	24.29	24.29	24.29	24.29	24.29	24.29	24.29	24.29	24.29	24.29	24.29	24.29	24.29
1943	24.29	24.29	24.29	24.29	24.29	24.29	24.29	24.29	24.29	24.29	24.29	24.29	24.29

No. 2 FOUNDRY PIG IRON COMPOSITE

Average of No. 2 foundry pig iron prices (per gross ton) at Bethlehem, Birmingham, Buffalo, Chicago, Cleveland, Neville Island, Granite City, Youngstown.

	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Avg.
1951	$52.54	$52.54	$52.54	$52.54	$52.54	$52.54	$52.54	$52.54	$52.54	$52.54	$52.54	$52.54	$52.54
1950	46.20	46.47	46.47	46.47	46.47	46.47	46.57	46.85	47.55	49.20	49.54	52.54	47.57
1949	46.67	46.63	46.63	46.60	46.13	46.07	46.08	46.10	46.10	46.10	46.10	46.10	46.28
1948	38.94	39.77	39.81	39.68	40.10	40.96	41.83	44.47	44.58	46.50	46.69	46.69	42.50
1947	30.17	30.17	32.80	32.99	32.99	32.99	34.32	36.54	36.62	36.64	36.85	36.78	34.16
1946	25.42	25.42	25.80	26.17	26.17	28.17	28.17	28.17	28.17	28.17	28.17	29.73	27.31
1945	23.67	24.17	24.67	24.67	24.67	24.67	24.67	24.67	24.67	24.86	25.42	25.42	24.69
1944	23.67	23.67	23.67	23.67	23.67	23.67	23.67	23.67	23.67	23.67	23.67	23.67	23.67
1943	23.67	23.67	23.67	23.67	23.67	23.67	23.67	23.67	23.67	23.67	23.67	23.67	23.67

STEELMAKING SCRAP PRICE COMPOSITE

Average of No. 1 heavy melting steel scrap prices (per gross ton) at Pittsburgh, Chicago and eastern Pennsylvania.

	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Avg.
1951	$46.33	$44.00	$44.00	$44.00	$44.00	$44.00	$44.00	$44.00	$44.00	$43.60	$43.00	$43.00	$43.99
1950	26.93	27.52	28.23	29.40	33.82	39.25	37.04	40.00	40.93	41.37	41.33	45.50	35.94
1949	41.54	38.48	34.60	24.06	22.29	20.85	19.21	20.86	26.07	26.71	28.96	28.03	27.64
1948	40.75	40.48	40.21	40.41	40.67	40.67	41.43	43.33	43.33	43.25	43.25	43.25	41.75
1947	31.20	33.50	37.25	33.94	29.75	32.48	37.23	39.00	37.83	39.85	40.42	40.13	36.05
1946	19.17	19.17	19.17	19.17	19.17	19.17	19.17	19.17	19.17	19.17	22.22	27.69	20.13
1945	19.17	19.17	19.17	19.17	19.17	19.17	19.17	19.17	19.17	19.17	19.17	19.17	19.17
1944	19.17	19.17	19.17	19.17	19.17	19.17	19.17	19.17	18.00	16.50	16.40	18.54	18.95
1943	19.17	19.17	19.17	19.17	19.17	19.17	19.17	19.17	19.17	19.17	19.17	19.17	19.17
1942	19.17	19.17	19.17	19.17	19.17	19.17	19.17	19.17	19.17	19.17	19.17	19.17	19.17
1941	21.00	20.05	20.15	19.17	19.17	19.17	19.17	19.17	19.17	19.17	19.17	19.17	19.50
1940	17.60	17.10	16.55	16.19	17.30	19.15	18.65	18.80	20.20	20.70	20.80	21.40	18.70
1939	14.90	14.95	15.15	14.[illegible]0	14.10	14.60	14.90	15.35	18.15	21.55	20.15	17.95	16.40

Prices

METALWORKING FACTS AND FIGURES

AVERAGE MONTHLY QUOTATIONS IN 1951

Finished Steel Prices are cents per pound unless otherwise noted; coke, dollars per net ton; other Products, dollars per gross ton. All prices are mill or furnace, unless otherwise noted. December figures subject to revision.

PITTSBURGH

	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.	OCT.	NOV.	DEC.
Structural Shapes	3.65	3.65	3.65	3.65	3.65	3.65	3.65	3.65	3.65	3.65	3.65	3.65
Plates	3.70	3.70	3.70	3.70	3.70	3.70	3.70	3.70	3.70	3.70	3.70	3.70
Bars, Hot-Rolled	3.70	3.70	3.70	3.70	3.70	3.70	3.70	3.70	3.70	3.70	3.70	3.70
Bars, Cold-Finished	4.55	4.55	4.55	4.55	4.55	4.55	4.55	4.55	4.55	4.55	4.55	4.55
Sheets, Hot-Rolled	3.65	3.65	3.65	3.65	3.65	3.65	3.65	3.65	3.65	3.65	3.65	3.65
Sheets, Cold-Rolled	4.35	4.35	4.35	4.35	4.35	4.35	4.35	4.35	4.35	4.35	4.35	4.35
Sheets, No. 10 Galvanized	4.80	4.80	4.80	4.80	4.80	4.80	4.80	4.80	4.80	4.80	4.80	4.80
Strip, Hot-Rolled	3.88	3.88	3.88	3.88	3.88	3.88	3.88	3.88	3.88	3.88	3.88	3.88
Strip, Cold-Rolled	5.08	5.08	5.08	5.08	5.08	5.08	5.08	5.08	5.08	5.08	5.08	5.08
Standard Spikes	6.15	6.15	6.15	6.15	6.15	6.15	6.15	6.15	6.15	6.15	6.15	6.15
Plain Wire	4.93	4.93	4.93	4.93	4.93	4.93	4.93	4.93	4.93	4.93	4.93	4.93
Wire Nails	6.00	6.00	6.00	6.00	6.00	6.00	6.00	6.00	6.00	6.00	6.00	6.00
Structural Rivets	7.85	7.85	7.85	7.85	7.85	7.85	7.85	7.85	7.85	7.85	7.85	7.85
Steel Pipe, Buttweld 1/2 in. (% discount from list)	42.5	42.5	42.5	42.5	42.5	42.5	42.5	42.5	42.5	42.5	42.5	42.5
Tin Plate, 1.50-pound coating (base box)	$8.70	$8.70	$8.70	$8.70	$8.70	$8.70	$8.70	$8.70	$8.70	$8.70	$8.70	$8.70
Pig Iron, Bessemer, Neville Island	53.00	53.00	53.00	53.00	53.00	53.00	53.00	53.00	53.00	53.00	53.00	53.00
Pig Iron, Basic, [illegible]	52.50	52.50	52.50	52.50	52.50	52.50	52.50	52.50	52.50	52.50	52.50	52.50
Pig Iron, No. 2 Foundry, Neville Island	52.50	52.50	52.50	52.50	52.50	52.50	52.50	52.50	52.50	52.50	52.50	52.50
Pig Iron, Malleable, Neville Island	52.50	52.50	52.50	52.50	52.50	52.50	52.50	52.50	52.50	52.50	52.50	52.50
Blast Furnace Silvery Pig Iron, 6.01-6.50% Si, Jackson Co., O., furnace	71.50	71.50	71.50	71.50	71.50	71.50	71.50	71.50	71.50	71.50	71.50	71.50
Billets, Bessemer and Open Hearth, Rerolling	56.00	56.00	56.00	56.00	56.00	56.00	56.00	56.00	56.00	56.00	56.00	56.00
Wire Rods (cents per pound)	4.20	4.20	4.20	4.20	4.20	4.20	4.20	4.20	4.20	4.20	4.20	4.20
Furnace Coke, spot, Connellsville, Pa.	$14.75	$14.75	$14.75	$14.75	$14.75	$14.75	$14.75	$14.75	$14.75	$14.75	$14.75	$14.75
Foundry Coke, spot, Connellsville, Pa.	17.50	17.50	17.50	17.50	17.50	17.50	17.50	17.50	17.50	17.50	17.50	17.50
Scrap, No. 1 Heavy Melting Steel	47.50	45.00	45.00	45.00	45.00	45.00	45.00	45.00	45.00	44.60	44.00	44.00
Scrap, Low Phos. (Bar crops and plates)	56.50	50.00	50.00	50.00	50.00	50.00	50.00	50.00	50.00	50.00	50.00	50.00
Scrap, No. 1 Cast, f.o.b. shipping point	58.10*	49.00	49.00	49.00	49.00	49.00	49.00	49.00	49.00	49.00	49.00	49.00

* Delivered, consumer's plant.

CHICAGO

	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.	OCT.	NOV.	DEC.
Bars, Steel	3.70	3.70	3.70	3.70	3.70	3.70	3.70	3.70	3.70	3.70	3.70	3.70
Plates	3.70	3.70	3.70	3.70	3.70	3.70	3.70	3.70	3.70	3.70	3.70	3.70
Structural Shapes	3.65	3.65	3.65	3.65	3.65	3.65	3.65	3.65	3.65	3.65	3.65	3.65
Bars, Rail Steel	4.75	4.75	4.75	4.75	4.75	4.75	4.75	4.75	4.75	4.75	4.75	4.75
Sheets, Cold-Rolled	4.35	4.35	4.35	4.35	4.35	4.35	4.35	4.35	4.35	4.35	4.35	4.35
Pig Iron, No. 2 Foundry	$52.50	$52.50	$52.50	$52.50	$52.50	$52.50	$52.50	$52.50	$52.50	$52.50	$52.50	$52.50
Pig Iron, Malleable	52.50	52.50	52.50	52.50	52.50	52.50	52.50	52.50	52.50	52.50	52.50	52.50
Scrap, No. 1 Heavy Melting Steel	45.00	43.50	43.50	43.50	43.50	43.50	43.50	43.50	43.50	43.10	42.50	42.50
Scrap, Rails for Rerolling	67.00	52.50	52.50	52.50	52.50	52.50	52.50	52.50	52.50	52.50	52.50	52.50
Scrap, No. 1 Cupola Cast, f.o.b. shipping point	62.20*	49.00	49.00	49.00	49.00	49.00	49.00	49.00	49.00	49.00	49.00	49.00

* Delivered, consumer's plant.

EASTERN PENNSYLVANIA

	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.	OCT.	NOV.	DEC.
Plates, Sparrows Point, Md.	3.70	3.70	3.70	3.70	3.70	3.70	3.70	3.70	3.70	3.70	3.70	3.70
Structural Shapes, del. Philadelphia	3.90	3.90	3.90	3.91	3.91	3.91	3.91	3.91	3.918	3.918	3.918	3.918
Steel Bars, del. Philadelphia	4.18	4.18	4.18	4.20	4.20	4.20	4.20	4.20	4.223	4.223	4.223	4.223
Sheets, Hot-Rolled, Sparrows Point, Md.	3.60	3.60	3.60	3.60	3.60	3.60	3.60	3.60	3.60	3.60	3.60	3.60
Pig Iron, Basic, del. Philadelphia	$56.39	$56.39	$56.39	$56.49	$56.49	$56.49	$56.49	$56.49	$56.61	$56.61	$56.61	$56.61
Pig Iron, No. 2 Foundry, del. Philadelphia	56.89	56.89	56.89	56.99	56.99	56.99	56.99	56.99	57.11	57.11	57.11	57.11
Pig Iron, Standard Low Phos., del. Philadelphia	63.00	63.00	63.00	63.12	63.12	63.12	63.12	63.12	63.37	63.37	63.37	63.37
Scrap, No. 1 Heavy Melting Steel	46.50	43.50	43.50	43.50	43.50	43.50	43.50	43.50	43.50	43.10	42.50	42.50
Scrap, No. 1 Cupola, f.o.b. shipping point	51.50*	49.00	49.00	49.00	49.00	49.00	49.00	49.00	49.00	49.00	49.00	49.00
Spiegeleisen, 19-21%, Palmerton, Pa., furnace	71.00	75.00	75.00	75.00	75.00	75.00	75.00	75.00	75.00	75.00	75.00	75.00

* Delivered, consumer's plant.

COAL CHEMICALS

	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.	OCT.	NOV.	DEC.
Benzol, per gallon, producers' plants, tank lots	32.50	32.50	32.50	32.50	32.50	32.50	32.50	32.50	32.50	32.50	32.50	32.50
Toluol, one degree, per gallon, producers' plants	29.50	29.50	29.50	29.50	29.50	29.50	29.50	29.50	29.50	29.50	29.50	29.50
Xylol, per gallon, producers' plants, tank lots	29.25	29.25	29.25	29.25	29.25	29.25	29.25	29.25	29.25	29.25	29.25	29.25
Phenol, 40, per pound producers' plants, carlots	17.25	17.25	17.25	17.25	17.25	17.25	17.25	17.25	17.25	17.25	17.25	17.25
Sulphate of Ammonia, per ton, bulk, ovens	38.50	38.50	38.50	38.50	38.50	38.50	38.50	38.50	38.50	38.50	38.50	38.50

Nonferrous Prices

METALWORKING FACTS AND FIGURES

NONFERROUS METAL PRICES

(Cents per pound)

	1951												Yearly Averages		
	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.*	1951*	1950	1949
Copper Sheets[1]	41.03	41.03	41.03	41.03	40.69	40.18	40.18	40.56	41.68	41.68	41.68	41.68	41.038	36.445	33.278
Copper Rods[1]	36.88	36.88	36.88	36.88	36.54	36.03	36.03	36.41	37.53	37.53	37.53	37.53	36.888	32.294	29.295
Copper Tubing[1]	41.07	41.07	41.07	41.07	40.73	40.22	40.22	40.60	41.72	41.72	41.72	41.72	41.078	36.472	33.302
Yellow Brass Sheets[1]	37.84	37.84	37.84	37.84	37.62	37.28	37.28	37.53	38.28	38.28	38.28	38.28	37.849	33.124	30.327
Yellow Brass Rods[1]	32.23	32.23	32.23	32.23	32.02	31.70	31.70	31.93	32.63	32.63	32.63	32.63	32.233	27.526	26.321
Yellow Brass Tubing[1]	40.85	40.85	40.85	40.85	40.62	40.29	40.29	40.54	41.29	41.29	41.29	41.29	40.858	36.134	33.275
Nickel Silver Sheets[3]	51.24	51.24	52.135	52.135	51.68	50.99	50.99	51.53	53.14	53.14	53.14	53.14	52.042	35.921	32.838
Phosphor Bronze Sheets[4]	59.345	59.345	61.51	61.51	60.67	59.42	59.42	59.83	61.07	61.07	61.07	61.07	60.444	35.611	32.540
Zinc Sheets[1]	24.50	24.50	24.50	24.50	24.50	24.50	24.50	24.50	24.50	25.30	26.50	26.50	24.900	38.581	32.664
Bronze Sheets[2]	40.55	40.55	40.55	40.55	40.24	39.78	39.78	40.12	41.13	41.13	41.13	41.13	40.553	46.870	43.564
Bronze Rods[2]	40.24	40.24	40.24	40.24	39.93	39.47	39.47	39.81	40.82	40.82	40.82	40.82	40.243	54.765	52.314
Bronze Tubing[2]	43.21	43.21	43.21	43.21	42.90	42.44	42.44	42.78	43.79	43.79	43.79	43.79	43.216	19.750	17.227
Yellow Brass Wire[1]	38.13	38.13	38.13	38.13	37.91	37.57	37.57	37.82	38.57	38.57	38.57	38.57	38.139	33.414	30.638
Copper Magnet Wire[5]	34.50	34.50	34.50	34.50	34.50	34.50	34.50	34.50	34.50	34.50	34.50	34.50	34.500	31.554	29.535
Weatherproof Copper Wire[6]	30.10	30.10	30.10	30.10	30.10	30.10	30.10	30.10	30.10	30.10	30.10	30.10	30.100	27.391	26.714
Bare Copper Wire[6]	29.55	29.55	29.55	29.55	29.55	29.55	29.55	29.55	29.55	29.55	29.55	29.55	29.550	25.787	25.183
85-5-5-5 Brass Ingot[7]	29.00	29.00	29.00	29.00	29.00	29.00	29.00	29.00	27.25	27.25	27.25	27.25	28.417	22.285	17.273
80-10-10 Brass Ingot[8]	35.00	35.00	35.00	35.00	35.00	35.00	35.00	34.00	32.25	32.25	32.25	32.25	34.000	26.606	22.628
88-10-2 Brass Ingot[9]	43.25	43.25	44.344	44.50	44.50	44.50	44.50	38.50	38.50	38.50	38.50	38.50	41.779	31.840	26.297
No. 1 Yellow Ingot[10]	25.20	25.00	25.438	25.50	25.50	25.50	25.50	25.50	23.25	23.25	23.25	23.25	22.553	19.330	14.664

[1] F.o.b. mill. [2] 80% Cu; f.o.b. mill. [3] 18% Ni; f.o.b. mill. [4] Grade A; f.o.b. mill. [5] Carlots; f.o.b. destination. [6] Carlots; f.o.b. eastern mill. [7] No. 115; delivered. [8] No. 305; delivered. [9] No. 215; delivered. [10] No. 405; delivered.

COPPER

Electrolytic, cents per lb. delivered Connecticut Valley

	1951	1950	1949	Yearly Averages	
Jan.	24.500	18.500	23.500	1951*	24.500
Feb.	24.500	18.500	23.500	1950	21.588
Mar.	24.500	18.500	23.486	1949	19.499
Apr.	24.500	18.940	21.774	1948	22.317
May	24.500	19.962	18.045	1947	21.215
June	24.500	22.231	16.606	1946	14.043
July	24.500	22.500	17.279	1945	12.000
Aug.	24.500	22.870	17.625	1944	12.000
Sept.	24.500	23.500	17.625	1943	12.000
Oct.	24.500	24.500	17.625	1942	12.000
Nov.	24.500	24.500	18.427	1941	12.000
Dec.	24.500	24.500	18.500	1940	11.528

ZINC

Prime Western, cents per lb. East St. Louis

	1951	1950	1949	Yearly Averages	
Jan.	17.500	9.810	17.500	1951*	17.994
Feb.	17.500	9.750	17.500	1950	13.879
Mar.	17.500	9.944	17.056	1949	12.152
Apr.	17.500	10.690	14.085	1948	13.563
May	17.500	11.990	11.880	1947	10.500
June	17.500	14.769	9.548	1946	8.727
July	17.500	15.000	9.346	1945	8.250
Aug.	17.500	15.000	10.000	1944	8.250
Sept.	17.500	17.100	10.058	1943	8.250
Oct.	19.426	17.500	9.317	1942	8.250
Nov.	19.500	17.500	9.760	1941	7.478
Dec.	19.500	17.500	9.769	1940	6.339

CADMIUM

Regular shapes, dollars per lb. del.

	1951	1950	1949	1948	1947	1946
Jan.	2.55	2.00	2.00	1.75	1.50	0.90
Feb.	2.55	2.00	2.00	1.75	1.56	0.90
Mar.	2.55	2.00	2.00	1.75	1.69	0.90
Apr.	2.55	2.00	2.00	1.75	1.75	0.90
May	2.55	2.00	2.00	1.75	1.75	0.90
June	2.55	2.11	2.00	1.75	1.75	0.90
July	2.55	2.15	2.00	1.75	1.75	0.99
Aug.	2.55	2.15	2.00	1.90	1.75	1.25
Sept.	2.55	2.34	2.00	1.90	1.75	1.25
Oct.	2.55	2.40	2.00	1.90	1.75	1.25
Nov.	2.55	2.44	2.00	1.94	1.75	1.31
Dec.	2.55	2.55	2.00	2.00	1.75	1.50
Av.	2.55	2.18	2.00	1.82	1.71	1.08

ANTIMONY

Domestic, bulk, carlots; cents per lb. f.o.b. Laredo, Tex.

	1951	1950	1949	Yearly Averages	
Jan.	35.462	29.920	38.500	1951*	42.335
Feb.	42.000	27.318	38.500	1950	27.626
Mar.	42.000	24.600	38.500	1949	36.875
Apr.	42.000	24.500	38.500	1948	35.010
May	42.000	24.500	38.500	1947	31.922
June	42.000	24.500	38.500	1946	15.972
July	42.000	24.500	38.500	1945	14.500
Aug.	42.000	24.648	38.500	1944	14.500
Sept.	42.000	31.020	38.500	1943	14.500
Oct.	42.000	32.000	32.000	1942	14.417
Nov.	44.560	32.000	32.000	1941‡	16.500
Dec.	50.000	32.000	32.000	1940‡	16.500

‡ Delivered New York

ALUMINUM

99% plus, ingots; cents per lb. f.o.b. shipping point

	1951	1950	1949	Yearly Averages	
Jan.	19.000	17.000	17.000	1951*	19.000
Feb.	19.000	17.000	17.000	1950	17.695
Mar.	19.000	17.000	17.000	1949	17.000
Apr.	19.000	17.000	17.000	1948	15.764
May	19.000	17.192	17.000	1947	15.000
June	19.000	17.500	17.000	1946	15.000
July	19.000	17.500	17.000	1945	15.000
Aug.	19.000	17.500	17.000	1944	15.000
Sept.	19.000	17.680	17.000	1943	15.000
Oct.	19.000	18.970	17.000	1942	15.000
Nov.	19.000	19.000	17.000	1941	16.500
Dec.	19.000	19.000	17.000	1940	18.692

LEAD

Common grade, cents per lb. St. Louis

	1951	1950	1949	Yearly Averages	
Jan.	16.800	11.800	21.325	1951*	17.294
Feb.	16.800	11.800	21.325	1950	13.095
Mar.	16.800	10.763	18.825	1949	15.191
Apr.	16.800	10.420	15.017	1948	17.867
May	16.800	11.521	13.566	1947	14.504
June	16.800	11.608	11.850	1946	7.957
July	16.800	11.460	13.335	1945	6.350
Aug.	16.800	12.726	14.806	1944	6.350
Sept.	16.800	15.600	14.853	1943	6.350
Oct.	18.726	15.840	13.242	1942	6.331
Nov.	18.800	16.800	12.348	1941	5.643
Dec.	18.800	16.800	11.800	1940	5.029

COBALT

97-98%, dollars per lb for 550 lb keg

	1951	1950	1949	1948	1947	1945-46
Jan.	2.10	1.80	1.65	1.65	1.50	1.50
Feb.	2.10	1.80	1.65	1.65	1.50	1.50
Mar.	2.10	1.80	1.65	1.65	1.50	1.50
Apr.	2.10	1.80	1.80	1.65	1.50	1.50
May	2.10	1.80	1.80	1.65	1.50	1.50
June	2.10	1.80	1.80	1.65	1.50	1.50
July	2.10	1.80	1.80	1.65	1.53	1.50
Aug.	2.10	1.80	1.80	1.65	1.65	1.50
Sept.	2.10	1.80	1.80	1.65	1.65	1.50
Oct.	2.40	1.80	1.80	1.65	1.65	1.50
Nov.	2.40	1.80	1.80	1.65	1.65	1.50
Dec.	2.40	2.025	1.80	1.65	1.65	1.50
Av.	2.18	1.82	1.76	1.65	1.57	1.50

SILVER

Open market, cents per fine oz. New York

	1951	1950	1949	Yearly Averages	
Jan.	88.890	73.250	70.000	1951*	89.385
Feb.	90.160	73.250	70.838	1950	74.165
Mar.	90.160	73.120	71.500	1949	71.932
Apr.	90.160	77.750	71.500	1948	74.665
May	90.160	72.635	71.500	1947	71.959
June	88.492	72.750	71.500	1946†	80.151
July	90.160	72.750	71.500	1945†	51.928
Aug.	90.160	72.750	71.889	1944†	44.750
Sept.	90.160	72.750	73.202	1943†	44.750
Oct.	88.120	74.980	73.250	1942†	38.333
Nov.	88.000	80.000	73.250	1941†	34.783
Dec.	88.000	80.000	73.250	1940†	34.773

† As reported by Handy & Harman, New York

NICKEL

Electrolytic Cathodes, 99.5%, base sizes unpacked, cents per lb. f.o.b. refinery

	1951	1950	1949	Yearly Averages	
Jan.	50.500	40.000	40.000	1951*	54.000
Feb.	50.500	40.000	40.000	1950	44.809
Mar.	50.500	40.000	40.000	1949	40.000
Apr.	50.500	40.000	40.000	1948	36.528
May	50.500	40.308	40.000	1947	35.000
June	56.500	48.000	40.000	1946	31.850
July	56.500	48.000	40.000	1945	35.000
Aug.	56.500	48.000	40.000	1944	35.000
Sept.	56.500	48.000	40.000	1943	35.000
Oct.	56.500	48.000	40.000	1942	35.000
Nov.	56.500	48.000	40.000	1941	35.000
Dec.	56.500	49.400	40.000	1940	35.000

TIN

Straits, spot; cents per lb. New York

	1951	1950	1949	Yearly Averages	
Jan.	171.798	76.020	103.000	1951*	127.072
Feb.	182.716	74.352	103.000	1950	95.552
Mar.	145.730	75.745	103.000	1949	99.996
Apr.	145.735	76.445	103.000	1948	99.250
May	139.923	77.500	103.000	1947	77.975
June	117.962	77.668	103.000	1946	54.563
July	106.000	89.680	103.000	1945	52.000
Aug.	103.000	102.120	103.000	1944	52.000
Sept.	103.000	101.250	101.654	1943	52.000
Oct.	103.000	113.390	95.505	1942	52.000
Nov.	103.000	137.710	89.823	1941	52.032
Dec.	193.000	144.740	78.966	1940	49.841

IRIDIUM

Dollars per troy ounce

	1951	1950	1949	1948	1947
Jan.	200.00	105.00	112.50	85.00	112.00
Feb.	200.00	100.00	107.50	86.88	110.00
Mar.	200.00	100.00	105.00	97.50	106.50
Apr.	200.00	100.00	105.00	112.00	91.50
May	200.00	100.00	105.00	115.00	90.00
June	200.00	100.00	105.00	112.50	86.25
July	200.00	145.00	105.00	107.00	85.00
Aug.	200.00	176.00	105.00	115.00	85.00
Sept.	200.00	220.00	105.00	114.50	85.00
Oct.	200.00	212.00	105.00	112.50	85.00
Nov.	200.00	200.00	105.00	112.50	85.00
Dec.	200.00	200.00	105.00	112.50	85.00
Av.	200.00	146.50	105.83	106.91	92.19

PLATINUM

Dollars per ounce

	1951	1950	1949	1948	1947	1946
Jan.	91.50	69.90	90.00	67.50	59.90	35.00
Feb.	91.50	67.50	86.75	70.50	59.50	35.00
Mar.	91.50	67.50	77.30	73.50	59.00	35.00
Apr.	91.50	67.50	73.50	94.70	61.50	35.00
May	91.50	67.50	73.50	99.50	61.20	35.00
June	91.50	67.50	71.70	85.50	57.25	49.63
July	91.50	73.50	70.50	87.90	54.50	68.50
Aug.	91.50	78.10	70.50	94.50	57.00	78.90
Sept.	91.50	98.25	70.50	94.50	67.50	86.50
Oct.	91.50	97.50	70.50	94.50	67.50	78.80
Nov.	91.50	91.50	70.50	94.50	67.50	70.50
Dec.	91.50	91.50	70.50	93.50	67.50	65.00
Av.	91.50	78.146	74.65	87.55	61.65	56.07

* Estimated

COPPER PRODUCTION, SHIPMENTS AND STOCKS

DOMESTIC STATISTICS—Net Tons

Period	PRODUCTION Primary	Secondary	Refined	Deliveries To Customers	Refined Stocks End of Period
1951					
11 Mos.	882,252	52,863	1,101,252	1,248,310	68,160
Jan.	81,737	5,224	110,144	108,128	54,883
Feb.	78,431	3,167	101,054	99,485	59,324
Mar.	85,060	6,183	112,933	116,793	55,609
Apr.	83,417	7,377	103,494	114,744	52,800
May	89,609	6,932	113,512	118,113	60,896(a)
June	79,967	7,136	105,127	114,103	60,912(a)
July	77,299	5,278	93,258	101,095	68,045(a)
Aug.	68,052	5,272	79,613	104,938(b)	70,937(a)
Sept.	71,964	2,201	74,354	121,879(b)	62,093(a)
Oct.	85,778	2,118	104,148	125,286(b)	78,192(a)
Nov.	80,938	1,975	103,614	123,746(b)	68,160
1950	940,249	117,439	1,270,768	1,371,464	49,040
1949	772,968	135,052	1,056,463	1,031,595	116,027
1948	850,088	130,410	1,233,697	1,344,445	96,080
1947	871,391	105,307	1,196,393	1,383,666	76,035
1946	618,757	32,503	604,071	1,260,921	80,832
1945	792,126	49,541	843,113	1,517,842	76,512
1944	995,938	60,242	1,098,788	1,636,295	66,780
1943	1,111,022	83,677	1,206,871	1,643,677	52,121
1942	1,098,007	54,337	1,135,708	1,635,236	65,309
1941	985,288	31,708	1,065,667	1,545,541	75,564

FOREIGN STATISTICS—Net Tons

Period	PRODUCTION Primary	Secondary	Refined	Deliveries To Customers	Refined Stocks End of Period
1951					
11 Mos.	1,267,483	4,814	1,115,837	907,043	166,640
Jan.	114,267	284	97,599	71,597	146,837
Feb.	108,318	348	90,156	71,467	151,288
Mar.	118,925	216	100,946	80,050	161,720
Apr.	117,707	259	104,831	87,829	164,588
May	115,162	258	97,004	92,505	150,549
June	107,659	326	94,696	78,941	151,823
July	115,255	778	104,599	82,251	159,472
Aug.	113,247	852	105,907	83,607	161,269
Sept.	112,851	656	101,133	74,131	163,538
Oct.	122,543	490	115,825	89,495	170,477
Nov.	121,549	347	103,141	95,170	166,640
1950	1,347,356	11,387	1,127,329	898,601	139,919
1949	1,270,529	10,241	1,076,114	933,641	147,972
1948	1,271,884	8,526	1,072,229	901,073	175,669
1947	1,229,825	8,995	1,016,856	921,851	143,979
Total Domestic and Foreign					
1951					
11 mos.	2,149,735	57,677	2,217,089	2,155,353	234,800
1950	2,287,605	128,826	2,398,097	2,270,065	188,959
1949	2,043,515	145,293	2,132,577	1,965,236	263,999
1948	2,121,972	138,936	2,305,926	2,245,518	271,749
1947	2,101,216	114,302	2,213,249	2,305,517	220,014

Copper Institute. Includes tonnage delivered: (a) to U. S. consumers at foreign ports; (b) from government stocks.

Imports of Copper

Unrefined, Scrap, Refined, Net Tons

	1951	1950	1949	1948	1947	1946
Jan.	45,831	56,213	48,329	30,435	26,261	60,026
Feb.	44,850	61,378	59,158	46,638	26,114	15,583
Mar.	36,062	45,207	64,790	46,981	26,291	8,193
Apr.	41,812	34,520	48,702	37,727	23,203	25,666
May	46,771	66,117	48,802	33,271	40,138	31,193
June	48,624	87,222	46,570	46,840	52,527	20,510
July	46,696	29,347	33,829	46,684	37,524	35,755
Aug.	58,969	33,576	45,372	39,730	44,185	21,272
Sept.	40,566	36,298	38,176	35,423	41,596	25,182
Oct.		62,645	37,241	36,947	44,045	32,503
Nov.		39,172	41,786	35,491	36,902	33,182
Dec.		54,807	59,054	52,222	54,513	45,431
Monthly Avg.		50,542	47,650	40,700	37,775	29,541

U. S. Bureau of the Census

Exports of Copper

Refined and Manufactures, Net Tons

	1951	1950	1949	1948	1947	1946
Jan.	8,726	12,165	21,041	18,013	14,921	12,427
Feb.	16,027	20,748	10,653	18,297	11,068	10,966
Mar.	14,457	19,021	15,415	15,043	13,467	7,336
Apr.	17,652	17,120	11,248	23,272	11,721	6,267
May	14,041	14,064	14,910	19,861	14,021	4,225
June	13,162	11,434	17,066	21,079	17,254	7,341
July	13,535	9,785	10,349	15,069	14,569	7,489
Aug.	6,714	12,230	8,695	20,623	21,606	9,173
Sept.	4,971	12,635	14,214	12,085	18,337	5,386
Oct.		11,925	9,388	17,861	19,295	2,131
Nov.		12,226	13,075	11,636	22,497	10,564
Dec.		20,905	25,049	13,725	18,299	14,168
Monthly Avg.		14,472	14,259	17,214	16,421	8,123

U. S. Bureau of the Census

Brass Ingot Shipments

Net Tons

	1951	1950	1949	1948
Jan.	25,410	18,874	10,456	26,908
Feb.	21,168	18,482	12,026	22,487
Mar.	31,907	22,494	14,500	24,282
Apr.	30,172	22,318	10,095	25,977
May	31,297	23,644	11,111	23,716
June	33,847	25,061	9,406	24,401
July	22,016	21,606	10,220	20,456
Aug.	25,253	25,689	11,191	24,068
Sept.	22,285	28,811	16,208	23,641
Oct.	21,121	32,246	18,036	21,559
Nov.		31,248	18,488	21,731
Dec.		28,757	17,960	20,954
Total		301,562	175,643	275,500

Compiled by Ingot Brass & Bronze Industry representing in excess of 95 per cent of brass and bronze industry.

Copper Consumption in U.S.

Refined Metal, Net Tons

	1950†	1949	1948
Brass Mills	674,000	478,126	614,314
Wire Mills	720,000	677,223	765,849
Chemical Plants	5,000	1,576	3,229
Secondary Smelters		4,463	6,805
Foundries & Misc.	21,000	21,808	30,387
Total	1,420,000	1,183,196	1,420,584

† Preliminary. U. S. Bureau of Mines.

Copper and Brass Mill Fabricator Statistics

(Summary of statistics which cover United States duty-free copper until Mar. 1, 1941; duty paid foreign copper included thereafter; beginning January, 1947, copper from all sources, duty free. Figures given in net tons.)

End of period	DELIVERIES Deliveries to Users (actual consump)	Producer Deliveries to Fabricators	STOCKS Fabricators' Refined Stocks	Less Working Stocks	Visible Supplies	Plus Undelivered Purchases	Total Stocks and Purchases	Unfilled Orders
1951								
10 mos.	1,171,098	1,121,364	257,862	293,375	35,513	43,281	7,768	317,285
Jan.	126,660	108,128	268,702	290,852	22,150	89,161	67,011	281,162
Feb.	117,853	99,485	248,593	289,712	41,119	94,374	53,255	285,930
Mar.	113,962	116,793	252,360	290,012	37,652	94,007	56,355	306,307
Apr.	119,172	114,744	247,002	293,265	46,263	85,893	39,630	310,446
May	118,522	118,113	251,692	292,283	40,591	64,397	23,806	323,454
June	129,283	114,103	237,808	291,954	54,146	58,370	4,224	327,017
July	84,288	101,095	263,968	288,482	24,514	50,711	26,197	343,683
Aug.	122,464	104,938	248,984	284,999	36,015	53,500	17,485	321,198
Sept.	115,135	121,879	253,459	286,265	32,806	47,303	14,497	321,745
Oct.	123,758	125,286	257,862	293,375	35,513	43,281	7,768	317,285
1950	1,438,237	1,371,464	290,241	288,392	1,849	92,372	94,221	313,052
Jan.	108,921	111,668	354,487	283,119	71,368	95,890	167,258	175,950
Feb.	102,896	112,773	363,924	286,976	76,948	92,002	168,950	196,034
Mar.	106,668	123,054	381,107	293,311	87,796	79,540	167,336	200,518
Apr.	124,032	101,729	358,243	287,495	70,748	105,064	175,812	196,422
May	133,365	113,837	338,504	283,421	55,083	89,561	144,644	217,366
June	131,527	125,016	332,330	277,605	54,725	72,787	127,512	213,478
July	97,961	96,096	329,785	271,540	58,245	104,647	162,802	307,368
Aug.	137,518	112,107	305,174	279,823	25,351	98,324	123,675	337,057
Sept.	125,625	119,529	300,000	289,446	10,554	87,662	98,216	324,771
Oct.	128,202	121,806	292,563	289,914	2,649	90,412	93,061	308,326
Nov.	127,060	111,985	277,590	282,959	5,369	103,425	98,056	313,450
Dec.	114,462	121,954	290,241	288,392	1,849	92,372	94,221	313,052
1949	1,053,225	1,031,595	354,992	285,298	69,694	82,793	152,487	189,407
1948	1,394,307	1,344,445	379,346	295,958	83,388	81,496	164,884	315,944
1947	1,338,383	1,383,666	423,432	293,859	129,573	103,765	233,338	338,260
1946	1,231,225	1,260,921	411,013	286,418	124,595	59,421	184,016	526,648
1945	1,462,440	1,517,842	375,618	268,490	107,128	44,100	151,228	362,436
1944	1,656,052	1,636,295	334,017	289,160	44,857	53,538	98,395	285,654
1943	1,701,753	1,643,955	353,948	299,796	54,152	90,807	144,959	465,258
1942	1,517,983	1,635,236	414,668	340,547	74,121	135,481	209,602	613,005
1941	1,577,765	1,545,541	295,813	291,515	4,298	241,335	245,633	547,468
1940	959,607	1,001,886	339,376	240,740	98,636	326,269	424,905	414,892
1939	793,399	814,407	300,543	184,833	115,710	185,687	305,397	237,752
1938	526,743	481,807	323,439	182,465	140,974	112,254	253,228	177,286

Nonferrous Metals

Slab Zinc

Net Tons

(Commencing with January, 1948, all regularly operating United States primary and secondary smelters are included. Production from foreign ores is included commencing with 1940)

	Stock Beginning	Production	SHIPMENTS Domestic	SHIPMENTS Export & Drawback	SHIPMENTS Gov't. Acc't.	SHIPMENTS Total	Unfilled Orders at End
1951*	8,884	930,000	835,000	37,000	40,000	912,000	70,000
Jan	8,884	80,937	72,068	3,156	4,385	79,609	72,770
Feb	10,212	70,285	64,784	2,316	2,280	69,380	76,446
Mar	11,117	80,450	70,845	5,916	3,701	80,462	80,769
Apr	11,105	77,862	69,125	2,473	2,821	74,419	77,293
May	14,548	80,430	73,093	1,434	3,040	77,567	73,942
June	17,411	77,679	74,149	1,911	3,239	79,299	73,304
July	15,791	78,955	76,461	3,020	3,865	83,346	62,412
Aug	11,400	74,035	65,696	3,200	5,295	74,191	62,867
Sept	11,244	70,623	58,436	3,144	3,052	64,632	66,838
Oct	17,235	79,432	68,365	2,167	3,051	73,583	66,293
Nov	23,084	79,376	70,084	4,517	2,818	77,419	67,268
1950	94,221	910,354	849,246	18,189	128,256	995,691	74,795
1949	20,848	870,113	648,285	56,929	91,526	796,740	42,625
1948	68,047	850,105	770,396	69,910	57,598	897,904	51,318
1947	175,800	848,027	698,281	117,305	140,230	955,816	59,705
1946	259,391	759,346	714,292	66,638	62,007	842,937	58,057
1945	237,520	799,520	762,925	9,422	5,302	777,649	27,092
1944*	173,510	901,332	830,334	6,988		837,322	21,332
1943	89,275	971,873	831,430	56,208		887,638	44,914
1942	24,066	929,770	733,918	151,650		885,568	52,752
1941	17,582	863,955	751,276	106,195		857,471	87,666
1940	74,262	706,100	674,615	88,165	....	762,780	125,132
1939	126,769	538,198	598,972			598,972	53,751
1938	65,333	456,990	395,534	20		395,554	40,829
1937	44,955	589,619	569,241			569,241	48,339
1936	83,758	523,166	561,969			561,969	78,626
1935	118,005	431,499	465,687	59		465,746	51,186
1934	105,560	366,933	352,515	148		352,663	30,786
1933	124,856	324,705	343,762	239		344,001	15,978
1932	129,842	213,531	218,347	170		218,517	8,478
1931	143,618	300,738	314,473	41		314,514	18,273
1930	75,430	504,463	436,079	196		436,275	26,651
1929	46,430	631,601	596,249	6,352		602,601	18,585

American Zinc Institute Inc.

* Estimated

U. S. Lead

Refiners' Stocks, Production, Shipments

Net Tons

	Stock at Beginning	Production (Inc. Secondary)	Total Supply	Domestic Shipments
1951*	35,619	484,000	519,619	492,000
January	35,619	48,878	84,497	51,260
February	33,232	43,675	76,907	49,128
March	27,775	50,701	78,476	50,927
April	27,259	44,362	71,621	42,033
May	29,437	44,951	74,388	40,963
June	33,420	39,952	73,372	40,041
July	33,308	44,864	78,172	44,404
August	33,504	31,756	65,260	40,252
September	24,997	30,474	55,471	31,654
October	23,640	34,273	57,913	31,164
1950	70,424	571,763	642,187	499,637
1949	38,644	542,676	581,320	355,905
1948	21,328	511,356	532,684	430,630
1947	47,587	541,065	588,652	566,666
1946	44,867	396,688	441,555	393,904
1945	19,536	524,328	543,864	500,003
1944	33,090	538,618	571,708	552,063
1943	34,937	546,673	581,610	548,417
1942	20,185	633,818	654,003	618,947
1941	40,926	634,888	675,814	655,542
1940	58,777	685,480	644,257	603,143
1939	115,902	497,991	613,893	555,074
1938	129,131	408,539	537,570	421,625
1937	171,856	533,215	705,071	575,933
1936	222,306	463,006	685,312	513,361
1935	234,030	421,764	655,794	433,456
1934	203,061	412,298	615,359	379,807
1933	176,157	374,153	550,310	347,156
1932	151,653	342,137	493,790	317,261
1931	103,247	478,591	581,838	429,949
1930	51,076	688,787	739,863	637,384

American Bureau of Metal Statistics

* Estimated

Mine Production of Zinc

Net Tons

	1951	1950	1949	1948	1947
Jan	59,651	43,606	51,656	48,068	55,036
Feb	56,878	46,030	52,963	48,241	51,770
Mar	60,670	51,692	62,049	54,989	55,874
Apr	56,467	49,183	59,185	53,425	58,447
May	58,233	52,111	55,925	51,927	59,098
June	56,473	50,625	54,271	51,755	62,121
July	53,379	48,423	40,256	47,095	47,719
Aug	54,403	56,221	45,068	49,748	48,855
Sept	50,089	54,794	41,887	52,581	47,608
Oct	60,004	55,791	38,823	53,542	51,506
Nov		54,604	40,112	55,005	48,976
Dec		55,127	41,687	55,141	50,598
Mo. Avg.		51,517	48,657	52,498	53,134

U. S. Bureau of Mines

Mine Production of Lead

Net Tons

	1951	1950	1949	1948	1947
Jan	35,481	35,640	33,010	33,144	31,066
Feb	33,870	34,825	32,562	32,399	29,817
Mar	37,096	39,056	39,714	35,889	32,134
Apr	33,587	35,558	36,979	35,111	32,979
May	34,005	38,024	36,731	33,268	32,772
June	32,681	36,957	36,069	34,521	32,452
July	30,491	31,398	29,778	23,301	29,106
Aug	29,872	36,030	33,852	23,551	30,597
Sept	27,653	35,104	30,549	26,910	30,647
Oct	33,133	35,731	29,734	35,337	32,512
Nov	..	35,377	31,186	36,504	30,618
Dec	..	36,175	33,868	36,997	30,567
Mo. Avg.		35,902	34,159	32,540	31,272

U. S. Bureau of Mines

Standard Specifications for Slab Zinc

Maximum—Per Cent

Grade	Pb	Fe	Cd	Sum of Pb, Fe, Cd
Special High Grade*	0.006	0.005	0.004	0.01
High Grade*	0.07	0.02	0.07	0.10
Intermediate*	0.20	0.03	0.50	0.50
Brass Special*	0.60	0.03	0.50	1.00
Select*	0.80	0.04	0.75	1.25
Prime Western	1.60	0.08	...	...

*No aluminum allowed

CONSUMPTION OF SLAB ZINC IN U.S.

Net Tons

	Galvanizing	Brass & Bronze Ingots	Rolled Zinc	Zinc-Base Alloys	Miscellaneous	Total
1951						
Jan.	**32,902**	**11,735**	**6,112**	**21,405**	**2,406**	**74,560**
Feb.	**28,213**	**10,097**	**5,088**	**19,651**	**2,076**	**65,125**
Mar.	**32,984**	**11,718**	**5,668**	**23,174**	**2,569**	**76,113**
Apr.	**31,934**	**11,703**	**5,238**	**22,541**	**1,948**	**73,364**
May	**33,901**	**11,870**	**5,753**	**23,559**	**2,439**	**77,522**
June	**33,525**	**11,359**	**5,148**	**24,874**	**2,483**	**77,389**
July	**31,199**	**8,848**	**4,418**	**23,885**	**2,599**	**70,949**
1950	**434,094**	**136,451**	**67,779**	**281,385**	**27,656**	**947,365**
1949	**350,880**	**85,534**	**55,200**	**202,181**	**18,046**	**711,841**
1948	**370,969**	**109,140**	**76,672**	**234,628**	**26,326**	**817,735**
1947	**361,327**	**112,347**	**70,680**	**214,469**	**27,537**	**786,360**
1946	**319,759**	**149,102**	**92,397**	**212,211**	**27,773**	**801,242**
1945	**337,200**	**259,400**	**97,600**	**130,800**	**27,300**	**852,300**

CONSUMPTION OF LEAD IN U.S.—1950-51

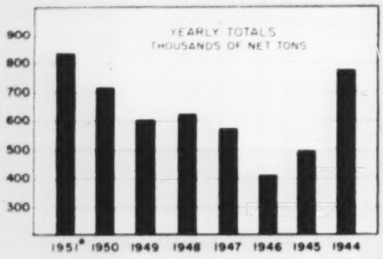
Net Tons

	Total 1950	1951 Jan.	Feb.	Mar.	Apr.	May	June	July
Metal Products:								
Ammunition	**38,437**	**4,142**	**3,683**	**3,880**	**4,703**	**3,632**	**3,504**	**3,235**
Bearing Metals*	**37,497**	**4,227**	**3,502**	**2,450**	**2,619**	**2,639**	**3,224**	**1,600**
Brass & Bronze	**18,591**	**2,196**	**1,949**	**3,576**	**3,433**	**3,490**	**1,781**	**2,689**
Cable Covering	**139,867**	**14,788**	**11,590**	**14,576**	**12,604**	**11,030**	**10,284**	**6,047**
Calking Lead	**47,310**	**5,873**	**4,280**	**4,758**	**4,205**	**4,322**	**3,980**	**3,628**
Casting Metals	**17,872**	**2,759**	**2,976**	**2,820**	**2,573**	**1,372**	**1,840**	**1,215**
Collapsible Tubes	**12,282**	**1,448**	**1,340**	**1,507**	**1,599**	**1,101**	**1,161**	**908**
Foil	**3,941**	**324**	**377**	**571**	**485**	**205**	**213**	**182**
Pipes, Traps & Bends	**40,638**	**3,495**	**2,895**	**3,666**	**2,986**	**2,537**	**2,579**	**2,657**
Sheet Lead	**33,254**	**3,622**	**3,319**	**3,098**	**3,365**	**2,802**	**2,274**	**2,138**
Solder	**88,242**	**9,066**	**7,040**	**8,559**	**7,393**	**6,757**	**6,288**	**5,910**
Storage Batteries								
Antimonial Lead	**222,685**	**22,480**	**18,138**	**18,500**	**23,219**	**17,030**	**13,071**	**13,517**
Oxides	**171,411**	**17,058**	**14,759**	**16,248**	**16,695**	**15,017**	**17,214**	**11,534**
Terne Metal	**3,301**	**231**	**54**	**443**	**336**	**231**	**124**	**77**
Type Metal	**24,710**	**3,201**	**2,400**	**2,404**	**2,363**	**2,322**	**2,267**	**1,824**
Total Metal Products	**903,038**	**94,940**	**78,302**	**87,056**	**88,578**	**74,487**	**69,806**	**57,151**
Pigments	**159,848**	**17,800**	**13,218**	**15,975**	**15,747**	**11,361**	**10,220**	**10,429**
Chemicals	**125,412**	**12,507**	**8,815**	**13,988**	**10,574**	**13,380**	**10,969**	**10,481**
Miscellaneous Uses	**26,415**	**3,159**	**3,035**	**3,233**	**2,899**	**2,723**	**2,890**	**2,792**
Total consumed	**1,214,713**	**128,406**	**103,370**	**120,252**	**117,798**	**101,951**	**93,885**	**80,853**

U. S. Bureau of Mines

Nonferrous Metals

PRIMARY ALUMINUM PRODUCTION



1951-1945 By Months—Net Tons

	1951	1950	1949	1948	1947	1946	1945
Jan.	67,954	52,023	53,356	48,767	50,045	24,750	48,650
Feb.	62,740	50,443	49,749	45,699	47,002	22,250	45,650
Mar.	70,022	58,747	54,852	51,874	53,032	26,000	53,100
Apr.	67,701	58,024	54,076	53,277	51,007	25,900	51,600
May	67,721	61,929	56,909	55,450	51,116	24,850	52,000
June	67,454	60,400	54,184	48,557	46,259	27,800	47,500
July	72,698	63,518	55,777	52,937	47,998	35,750	47,900
Aug.	73,816	63,008	52,001	54,953	47,064	39,850	45,800
Sept.	69,429	59,449	49,742	53,255	43,228	41,100	31,600
Oct.	......	62,915	45,790	54,526	43,959	45,000	25,000
Nov.	......	62,276	35,865	50,714	43,461	46,300	20,800
Dec.	......	65,897	41,161	53,474	47,589	50,700	24,000
Total	832,000*	718,627	603,462	623,456	571,750	409,630	495,060

Yearly totals reflect adjustments and in some instances vary slightly from the sums of monthly figures. * Estimated. U. S. Bureau of Mines.

Secondary Aluminum Production

Net Tons

	From New Scrap	From Old Scrap	As Metal	From Alloys	Total
1950	167,308	76,358	2,140	241,526	243,666
1949	136,166	44,596	313	180,419	180,762
1948	191,129	95,648	2,384	284,393	286,777
1947	180,990	163,847	5,105	339,732	344,837
1946	187,538	90,535	2,075	275,998	278,073
1945	271,076	27,311	2,145	296,242	298,387
1944	302,746	22,899	2,336	323,309	325,645
1943	280,867	33,094	5,926	308,035	313,961
1942	154,831	41,633	14,104	184,388	198,492
1941	63,744	43,113	8,308	98,549	106,857
1939	16,184	37,763	2,900	51,047	53,947

U. S. Bureau of Mines

Bauxite Production and Imports

Long Tons. Quarterly figures are preliminary and their sums differ slightly from final annual totals

	—Mine Production (dried equiv.)—			Imports as Shipped	Total New Supply
	Arkansas	Ala., Ga., Va.	Total		
1951					
1st Qtr	372,055	14,306	386,361	686,981	1,073,342
2nd Qtr	501,536	10,796	512,332	676,547	1,188,879
1950	N.A.	N.A.	1,347,039	2,476,677	3,823,716
1st Qtr	N.A.	N.A.	325,025	628,301	953,326
2nd Qtr	N.A.	N.A.	371,708	640,896	1,012,604
3rd Qtr	288,220	8,258	296,478	604,214	900,692
4th Qtr	345,834	7,994	353,828	603,266	957,094
1949	1,094,924	53,868	1,148,792	2,688,164	3,836,956
1st Qtr	303,048	14,690	317,738	602,134	919,872
2nd Qtr	279,051	12,553	291,604	625,772	917,376
3rd Qtr	194,066	12,441	206,507	704,876	911,383
4th Qtr	305,943	17,323	323,266	755,382	1,078,648
1948	1,395,341	61,807	1,457,148	2,488,915	3,946,063
1st Qtr	290,799	13,377	304,176	589,215	893,391
2nd Qtr	348,443	19,530	367,973	604,337	972,310
3rd Qtr	429,558	16,588	446,146	618,092	1,064,238
4th Qtr	360,068	13,540	373,608	677,271	1,050,879
1947	1,153,563	48,492	1,202,055	1,821,580	3,023,635
1946	1,019,118	53,707	1,072,825	852,005	1,924,830
1945	910,049	70,960	981,009	739,581	1,720,590
1944	2,695,317	128,407	2,823,724	560,461	3,384,185
1943	6,036,490	196,393	6,232,883	1,547,854	7,780,737

* Includes Mississippi. N.A. Not available. U. S. Bureau of Mines

Aluminum Wrought Products

Producers' Shipments, Thousands of Pounds

Period	Total	Plate, Sheet, and Strip	Rolled Structural Shapes, Rod, Bar, Wire	Extruded Shapes, Tube Blooms, and Tubing	Powder, Flake, and Paste
1951*	1,730,000	1,100,000	310,000	300,000	20,000
January	167,793	113,080	26,819	25,512	2,382
February	144,388	94,761	24,005	23,596	2,026
March	164,435	101,021	29,938	31,181	2,295
April	151,965	94,715	28,714	26,569	1,967
May	144,987	91,821	25,315	25,840	2,011
June	146,381	88,552	28,758	26,972	2,099
July	132,406	82,715	25,908	22,015	1,768
August	152,027	91,512	29,831	28,786	1,898
September	129,167	77,464	26,873	22,962	1,868
October	145,874	84,319	31,984	27,629	1,942
1950	1,689,689	1,142,183	269,780	255,230	22,496
January	100,727	68,525	15,359	15,686	1,157
February	113,990	79,713	17,529	15,513	1,235
March	149,031	107,367	20,972	19,523	1,169
April	129,393	89,406	20,002	18,494	1,491
May	129,384	87,536	20,133	20,255	1,460
June	138,774	93,944	20,995	22,081	1,754
July	133,600	90,300	20,885	20,176	2,239
August	170,890	114,493	27,850	25,549	2,998
September	166,653	111,304	27,470	25,808	2,053
October	162,828	106,803	27,568	26,077	2,380
November	150,372	99,687	24,377	23,878	2,430
December	153,020	101,573	26,620	22,703	2,124
1949	1,158,146	790,025	203,650	149,995	14,476
1948	1,640,186	1,268,297	182,991	171,944	16,954
1947	1,408,152	1,111,159	157,379	123,048	16,566

U. S. Bureau of the Census * Estimated

Antimony Imports

Metal imported for consumption in United States. Net Tons

Year	—Antimony Ore— Gross Weight	Sb Content	Needle or Liquidated Sb	Antimony Metal	Type Metal and Antimonial Lead†
1950	24,000	10,367	19	4,488	1,926
1949	17,855	7,473	81	1,853	654
1948	41,610	13,464	533	3,201	1,569
1947	28,471	9,257	17	5,879	187
1946	19,741	5,903		2,593	246
1945	49,385	22,643		627	1,380

U. S. Department of Commerce † Estimated antimony content

Magnesium Wrought Products

Shipments—Thousands of Pounds

	1951	1950	1949	1948	1947	1946
Jan	1,522	952	581	314	700	427
Feb	1,489	761	636	413	752	415
Mar	1,889	868	672	460	588	466
Apr	1,531	998	537	516	499	483
May	1,716	850	756	448	420	448
June	1,643	1,198	752	526	290	554
July	1,391	1,177	748	205	265	571
Aug	1,497	1,103	671	497	253	507
Sept	1,461	1,011	724	707	247	656
Oct	1,773	1,269	793	519	299	715
Nov		1,305	622	532	269	764
Dec		1,318	772	728	275	636
Year		12,810	8,264	5,865	4,807	6,642

U. S. Bureau of Mines

Antimony Production

Domestic mine production of ores and concentrates. Net Tons

Year	Gross Weight	—Antimony Content— Quantity	Average Per Cent
1950	6,888	2,497	36.3
1949	5,260	1,636	31.1
1948	16,239	6,489	40.0
1947	20,020	5,316	26.6
1946	13,962	2,505	17.9
1945	14,966	1,930	12.9

U. S. Bureau of Mines

Antimony Consumption

Industrial use of primary antimony—Net Tons

PRODUCTS	1950	1949	1948	1947
Ammunition	9	6	21	24
Antimonial Lead & Battery Metal	4,912	4,737	6,024	6,172
Bearing Metal and Bearings	3,256	873	1,803	2,056
Cable Covering	72	172	62	61
Castings	126	49	81	129
Collapsible Tubes and Foil	23	14	31	77
Sheet and Pipe		306	195	225
Solder	300	155	145	132
Type Metal	162	587	1,019	1,216
Nonmetal Products	5,868	4,631	6,074	6,555
Total	15,494	11,530	15,455	16,647

U. S. Bureau of Mines

Nonferrous Metals

METALWORKING FACTS AND FIGURES

U. S. Tin Imports

Ore (Tin Content), and Metal (Bars, Blocks, Pigs, etc.) in Long Tons

	Ore	Metal
1951		
Jan.	4,545	5,741
Feb.	2,927	2,213
Mar.	2,753	4,405
Apr.	2,204	2,273
May	1,334	1,203
June	2,924	1,868
July	2,663	2,321
Aug.	2,430	1,171
Sept.	591	1,865
1950		
Jan.	2,549	7,409
Feb.	1,383	8,184
Mar.	1,755	4,972
Apr.	1,392	2,941
May	374	10,434
June	473	8,613
July	658	11,641
Aug.	4,266	8,254
Sept.	3,882	5,136
Oct.	3,130	6,259
Nov.	1,685	5,008
Dec.	3,789	4,019
MONTHLY AVERAGES		
1950	2,169	6,910
1949	3,193	5,019
1948	3,124	4,080
1947	2,364	2,810
1946	3,178	1,558
1945	2,790	781
1944	2,962	1,112
1943	1,821	993
1942	2,411	2,229
1941	2,389	11,739

International Tin Study Group

Silver Production

(Thousands of ounces; commercial bars, 0.999 fine, and other refined forms.)

	Domestic†	Foreign	Total
1951*	40,000	32,000	72,000
Jan.	3,769	3,523	7,292
Feb.	3,374	3,088	6,462
Mar.	4,371	3,701	8,072
Apr.	3,429	2,734	6,163
May	3,482	4,078	7,560
June	3,932	2,168	6,100
July	2,758	2,233	4,991
Aug.	2,835	2,185	5,020
Sept.	2,585	2,170	4,755
Oct.	3,079	3,010	6,089
1950	42,068	37,656	79,724
Jan.	2,965	2,049	5,014
Feb.	2,496	1,935	4,431
Mar.	3,721	3,718	7,439
Apr.	4,224	3,661	7,885
May	3,890	3,652	7,542
June	2,669	3,374	6,043
July	4,102	2,232	6,334
Aug.	3,660	3,792	7,452
Sept.	4,222	2,413	6,635
Oct.	2,747	4,428	7,175
Nov.	3,433	4,138	7,571
Dec.	3,939	2,264	6,203
1949	34,559	28,226	62,785
1948	36,111	37,680	73,791
1947	36,053	39,645	75,698
1946	21,377	30,371	51,748
1945	29,332	38,786	68,118
1944	37,370	39,341	76,711
1943	44,812	51,295	96,107

† Includes purchases of crude silver by the United States Mint.

American Bureau of Metal Statistics

U. S. Tin Consumption

Long Tons

	Consumption			
	Primary	Secondary	Total	Stocks
1951*	60,000	30,500	90,500	50,000
Jan.	6,456	2,881	9,337	60,200
Feb.	4,976	2,458	7,434	56,706
Mar.	5,152	2,707	7,859	55,873
Apr.	4,984	2,645	7,629	52,075
May	5,295	2,508	7,803	51,279
June	4,520	2,734	7,254	51,279*
July	4,339	2,356	6,695	50,000*
Aug.	4,845	2,205	7,050	49,000*
1950	71,191	33,273	104,464	63,486
1949	47,163	25,243	72,406	59,813
1948	59,863	30,925	90,788	63,517
1947	59,166	28,934	88,100	68,728
1946	54,627	26,316	80,943	60,565
1945	55,642	27,941	83,583	71,408
1944	59,156	30,813	89,969	89,914
1943	46,253	34,077	80,330	106,784
1942	56,288	29,399	85,687	127,797
1941	103,086	31,609	134,695	146,888
1940	72,324	24,830	97,154	92,770
1939	66,583	15,845	82,428	37,076
1938	48,116	11,658	59,774	27,158

International Tin Study Group; Bureau of Mines.

Nickel Production

Net Tons

	Canada	Other Countries	Estimated Total
1951*	137,500	20,000	157,500
1950*	123,500	32,800	156,300
1949	128,328	32,672	161,000
1948	131,740	34,260	166,000
1947	118,627	34,373	154,000
1946	96,062	39,938	136,000
1945	122,565	37,435	160,000
1944	137,299	35,701	173,000
1943	144,009	40,091	184,100
1942	142,606	31,594	174,200
1941	141,129	37,471	178,600
1940	122,779	31,521	154,300
1939	113,053	21,447	134,500
1938	105,286	22,014	127,300
1937	112,453	19,947	132,400
1936	84,870	18,080	102,950
1935	69,258	16,042	85,300
1934	64,344	14,556	78,900
1933	41,632	9,368	51,000

U. S. Bureau of Mines; Dominion Bureau of Statistics; STEEL.

Tungsten

U. S. Mines—Pounds

	Production	Shipments
1951		
1st Qtr.	1,335,580	1,243,581
1950	4,038,465	4,619,014
1st Qtr.	848,617	1,064,961
2nd Qtr.	1,054,823	1,057,995
3rd Qtr.	1,005,651	1,157,926
4th Qtr.	1,129,374	1,318,132
1949	2,896,084	2,631,506
1948	4,033,389	3,838,287
1947	3,026,470	2,944,622
1946	4,671,042	4,942,282
1945	5,388,639	5,266,818
1944	9,764,647	9,786,537

U. S. Bureau of Mines

U. S. Tin Smelter Output

Long Tons

	1951	1950	1949	1948	1947
Jan.	3,211	2,627	3,257	3,172	3,024
Feb.	3,096	2,362	3,254	2,800	2,815
Mar.	3,036	2,729	3,104	2,602	2,877
Apr.	3,058	2,484	2,851	2,906	2,816
May	3,060	2,852	3,007	3,310	3,112
June	2,655	2,204	3,006	3,650	2,712
July	2,406	2,256	2,910	3,500	2,517
Aug.	2,545	2,396	3,005	3,509	2,237
Sept.	2,155	2,806	2,910	2,859	2,356
Oct.	2,091	3,209	2,964	2,300	3,026
Nov.	1,806	3,207	2,994	2,907	2,759
Dec.	....	3,006	2,791	3,153	3,041
Total	31,000*	32,136	36,053	36,708†	33,300†

Office of Domestic Commerce. † Revised

World Tin

Long Tons

	Production	Consumption	Stocks
1951*	170,000	150,000	105,000
Jan.	15,200	13,100	102,800
Feb.	12,100	11,400	101,400
Mar.	14,100	11,300	103,700
Apr.	14,500	11,500	104,600
May	14,400	11,900	104,100
June	13,800	11,200	104,300*
July	11,900	11,000	104,000*
Aug.	15,500	16,800	104,500*
1950	172,100	147,000	115,900
1949	168,100	116,000	130,700
1948	157,400	134,000	134,100
1947	124,600	130,500	135,300
1946	99,300	111,000	153,600
1945	89,400	102,000	170,900
1944	93,700	102,500	156,500
1943	108,500	98,000	166,100
1942	101,500	119,000	171,900
1941	215,000	173,500	192,200

International Tin Study Group. Figures are partly estimated and include substantial revisions from previously reported totals. Stocks do not include those of consumers.

Molybdenum Products

Comprises ferromolybdenum, molybdic oxide, and molybdenum salts and metal

Pounds

	Production	Shipments†	Stocks
1951			
1st Qtr.	8,692,800	7,727,800	2,459,900
2nd Qtr.	7,730,200	7,930,500	2,259,600
1950	25,347,800	34,690,800	1,494,900
1st Qtr.	5,507,900	5,695,100	10,650,700
2nd Qtr.	5,418,600	6,383,500	9,685,800
3rd Qtr.	6,325,800	8,570,500	7,441,100
4th Qtr.	8,095,500	14,041,700	1,494,900
1949	19,624,200	16,333,100	10,837,900
1st Qtr.	6,397,400	5,229,900	8,714,300
2nd Qtr.	5,421,700	3,329,700	10,806,300
3rd Qtr.	4,146,000	3,589,100	11,363,200
4th Qtr.	3,592,800	4,159,200	10,796,800
1948	24,445,300	25,024,700	7,546,500
1947	20,659,700	20,744,900	8,126,200
1946	15,039,100	16,944,100	8,211,400

† Including exports.

U. S. Bureau of Mines

Manganese

(Supplies for United States Consumption, net tons.)

	Domestic Mine Shipments	General Imports		Exports		Net Supply
		Ore	Ferromanganese†	Ore	Ferromanganese†	
1951*	115,000	1,735,000	280,000	8,000	600	2,121,400
Jan.	9,000	167,358	27,300	633	130	202,895
Feb.	9,200	169,165	21,200	287	22	199,256
Mar.	9,300	162,012	17,200	973	70	187,469
Apr.	9,600	158,866	19,500	715	24	187,227
May	10,300	72,868	17,900	495	32	100,541
June	9,400	191,571	32,100	647	30	232,394
July	9,500	90,325	27,100	1,076	40	125,809
1950	139,000	1,837,950	221,684	8,962	1,160	2,188,512
1949	126,100	1,544,526	130,028	5,033	13,254	1,782,367
1948	131,100	1,256,597	195,360	9,236	39,175	1,534,646
1947	131,627	1,541,818	156,760	10,075	38,884	1,781,246
1946	143,635	1,749,223	61,947	19,137	5,690	1,929,978

† Expressed in terms of ore. * Estimated

U. S. Bureau of Mines

Molybdenum Concentrates

Pounds

	Production	Shipments†	Consumption	Stocks
1951				
1st Qtr.	9,672,700	9,457,300	8,987,300	3,908,600
2nd Qtr.	9,849,500	8,070,400	7,810,600	5,837,600
1950	28,480,000	44,544,000	26,029,000	4,089,800
1st Qtr.	5,813,300	7,595,000	5,549,000	17,627,800
2nd Qtr.	6,158,800	7,042,300	5,546,800	16,737,400
3rd Qtr.	7,773,500	8,037,500	6,525,200	16,704,500
4th Qtr.	8,731,000	21,865,400	8,408,000	4,089,800
1949	22,529,800	23,280,400	19,960,000	19,159,100
1948	26,706,000	29,669,000	25,156,000	21,205,800
1947	27,047,000	22,189,800	20,221,000	23,660,500

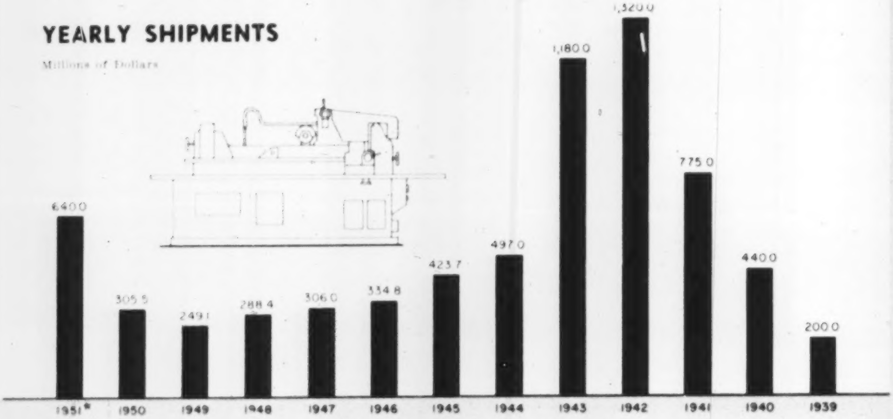
† Including exports, plus concentrates converted to oxide at Miami, Ariz., and Langeloth, Pa.

U. S. Bureau of Mines

* Estimated

Machine Tools

METALWORKING FACTS AND FIGURES



YEARLY SHIPMENTS

Millions of Dollars

INDEX OF MACHINE TOOL NEW ORDERS

Base: Average Shipments in 1945-46-47=100%

TOTAL NEW ORDERS (DOMESTIC AND FOREIGN)

	1951	1950	1949	1948	1947	1946	1945	1944	1943	1942	1941	1940	1939
Jan.	475.4	99.7	87.0	83.1	71.7	115.6	206.9	100.6	222.8	378.7	260.4	133.6	49.0
Feb.	615.3	89.2	80.9	77.3	63.8	79.8	205.4	118.9	270.4	471.1	244.5	135.6	51.7
Mar.	590.3	107.4	93.5	86.3	74.3	106.3	181.8	143.9	348.6	1,164.5	236.4	101.5	57.5
Apr.	516.1	98.9	70.1	86.3	69.8	123.4	172.4	194.7	245.4	902.1	215.8	104.2	48.7
May	483.0	116.4	63.7	73.5	76.9	107.9	154.8	207.2	212.9	639.9	219.8	117.4	69.0
June	558.8	124.1	53.6	83.4	90.9	109.1	123.3	182.3	176.6	563.7	281.7	145.8	68.3
July	490.6	253.1	48.0	74.0	81.1	99.0	100.3	121.6	140.2	477.3	313.2	132.9	73.0
Aug.	488.9	306.1	51.5	73.7	62.1	99.9	103.1	147.0	136.2	392.1	325.0	178.6	64.6
Sept. ...	380.2	280.6	57.7	73.1	63.7	86.4	85.8	125.5	125.5	331.2	304.7	229.6	119.4
Oct.	403.9	289.6	56.8	67.4	81.0	85.3	99.3	206.6	118.1	308.8	269.2	338.5	160.0
Nov.	332.6	291.9	84.3	72.2	75.6	73.2	89.1	210.6	127.2	343.9	322.3	250.3	174.2
Dec.	....	410.1	82.5	76.7	81.1	72.7	119.4	221.2	114.1	265.5	383.3	234.7	264.5
Avg.	....	205.5	69.1	77.2	74.3	96.5	137.0	165.0	186.5	519.9	281.4	175.2	100.0

DOMESTIC

	1951	1950	1949	1948	1947	1946	1945
Jan.	414.1	73.0	65.1	69.1	50.7	71.3	....
Feb.	537.3	70.4	54.4	64.6	48.0	55.8	....
Mar.	438.2	82.5	71.2	70.2	54.2	79.5	....
Apr.	450.0	81.5	47.0	72.2	51.0	98.1	....
May	447.3	98.0	47.9	62.1	60.6	83.8	....
June	502.4	101.1	37.9	71.5	73.7	73.4	....
July	435.7	230.8	34.0	60.7	64.4	69.7	....
Aug.	430.2	270.9	32.7	60.1	47.5	77.5	....
Sept. ...	353.2	253.4	44.0	61.5	49.0	68.1	74.6
Oct.	362.8	240.1	43.1	53.4	65.0	63.2	81.0
Nov.	303.0	265.3	67.3	54.1	64.1	48.7	70.8
Dec.	....	297.3	60.1	60.5	66.3	50.9	68.8
Avg. ..	....	172.0	50.4	63.3	57.9	70.0	....

FOREIGN

	1951	1950	1949	1948	1947	1946	1945
Jan.	61.3	26.7	21.9	14.0	21.0	44.3	....
Feb.	78.2	18.8	26.5	12.7	15.8	24.0	....
Mar.	102.1	24.9	22.3	16.1	20.1	26.8	....
Apr.	66.1	17.4	23.1	14.1	18.8	25.3	....
May	35.7	18.4	15.8	11.4	16.3	24.1	....
June	56.4	23.0	15.7	11.9	17.2	35.7	....
July	54.9	22.3	14.0	13.3	16.7	29.3	....
Aug.	58.7	34.2	18.8	13.6	14.6	22.4	....
Sept. ...	27.0	27.2	13.7	11.6	14.7	18.3	11.2
Oct.	41.1	49.5	13.7	14.0	16.0	22.1	18.3
Nov.	29.6	26.6	17.0	18.1	11.5	24.5	18.3
Dec.	....	112.8	22.4	16.2	14.8	21.8	50.6
Avg. ..	....	33.5	18.7	13.9	18.4	28.5	....

National Machine Tool Builders' Association

* Estimated

Machine Tools

METALWORKING FACTS AND FIGURES

INDEX OF MACHINE TOOL SHIPMENTS

Base: Average Shipments in 1945-46-47=100%

	1951	1950	1949	1948	1947	1946	1945	1944	1943	1942	1941	1940	1939
Jan.	114.3	52.8	68.8	75.3	91.7	105.9	130.0	190.6	297.0	282.5	171.5	81.2	36.2
Feb.	123.8	56.1	70.3	87.1	92.4	94.2	125.9	169.6	387.5	285.5	185.0	93.3	39.9
Mar.	156.9	75.3	75.8	83.6	100.4	95.2	140.4	175.5	424.2	332.6	194.1	97.1	48.4
Apr.	157.7	61.6	74.7	82.0	93.3	99.0	142.6	139.9	399.1	349.6	203.9	104.8	47.3
May	175.1	82.5	72.8	82.6	89.2	94.2	140.5	141.4	385.1	362.9	205.6	110.2	52.8
June	182.8	91.9	79.0	94.4	84.1	99.8	146.0	140.2	367.7	375.7	214.4	116.3	57.5
July	144.7	68.3	60.7	62.4	65.4	78.3	115.4	110.8	329.9	384.2	195.8	105.9	46.7
Aug.	178.9	95.7	67.3	69.8	63.6	92.5	113.1	119.0	294.9	396.8	217.5	137.6	56.8
Sept. ...	189.8	101.6	67.6	84.7	77.0	87.5	96.3	121.4	290.3	405.4	232.3	142.0	60.9
Oct.	221.3	100.9	62.3	80.4	94.8	99.9	109.5	126.9	264.8	439.7	261.1	166.4	71.7
Nov.	225.7	110.9	67.6	76.2	84.7	90.4	91.6	122.7	243.0	406.8	252.3	155.9	75.4
Dec.	....	135.7	75.7	96.9	98.4	95.2	81.7	128.8	205.7	446.3	287.5	177.2	82.9
Avg. ..	....	86.1	70.2	81.3	86.2	94.3	119.4	140.6	324.3	372.5	218.4	124.0	56.4

National Machine Tool Builders' Association

PRODUCERS' SHIPMENTS OF MACHINE TOOLS

Dollar Value and Number of Units

CLASSES OF MACHINE TOOLS	1950 Dollar Value and No. Units	1949 Dollar Value and No. Units	1948 Dollar Value and No. Units	1947 Dollar Value and No. Units	1946 Dollar Value and No. Units	1942 Dollar Value and No. Units
Boring Machines	$28,849,000 1,333 Units	$29,430,000 1,212 Units	$24,098,000 1,268 Units	$25,825,000 1,444 Units	$27,455,000 1,888 Units	$137,472,000 9,697 Units
Broaching Machines	4,862,000 363 Units	3,411,000 290 Units	3,779,000 343 Units	4,956,000 532 Units	4,657,000 573 Units	9,022,000 1,007 Units
Drilling Machines	32,776,000 9,900 Units	25,271,000 6,305 Units	32,816,000 10,125 Units	33,517,000 n.a.	33,970,000 26,704 Units	103,726,000 47,654 Units
Gear-cutting and Finishing Machines ...	19,819,000 1,498 Units	14,231,000 1,095 Units	16,407,000 1,367 Units	17,719,000 1,682 Units	17,870,000 1,852 Units	51,864,000 6,435 Units
Grinding and Polishing Machines (except gear-tooth grinding, honing, lapping, polishing and buffing machines)	60,557,000 79,146 Units	45,660,000 64,257 Units	47,294,000 98,792 Units	56,364,000 n.a.	54,352,000 55,632 Units	209,345,000 54,009 Units
Lathes	79,476,000 30,021 Units	62,289,000 18,631 Units	81,106,000 29,322 Units	92,908,000 n.a.	103,453,000 53,284 Units	455,250,000 88,878 Units
Milling Machines	35,827,000 5,486 Units	31,400,000 4,397 Units	34,914,000 6,064 Units	35,278,000 7,504 Units	41,367,000 10,857 Units	246,223,000 47,56[illegible] Units
Planers	3,035,000 84 Units	3,699,000 99 Units	4,828,000 157 Units	4,018,000 152 Units	4,853,000 206 Units	29,931,000 981 Units
Shapers (except gear shapers)	3,362,000 770 Units	2,831,000 666 Units	5,826,000 1,369 Units	6,880,000 1,787 Units	7,159,000 2,110 Units	n.a. n.a.
All Other Machine Tools	34,490,000 n.a.	23,148,000 n.a.	26,453,000 n.a.	44,891,000 n.a.	32,086,000 27,945 Units	78,915,000 50,960 Units
Total Machine Tools	$303,053,000 n.a.	$241,370,000 n.a.	$277,521,000 n.a.	$322,356,000 n.a.	$327,222,000 181,051 Units	$1,321,748,000 307,186 Units

U. S. Bureau of the Census

n.a.=Not available

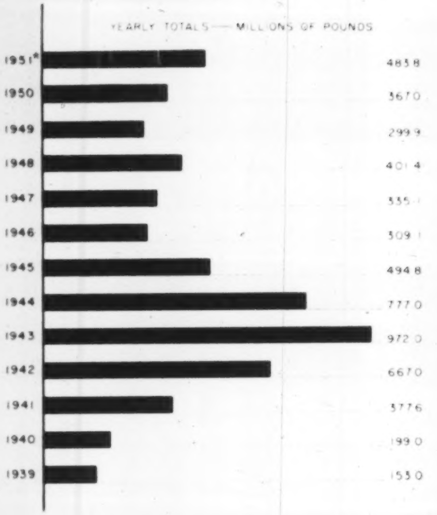
WELDING ELECTRODES

Shipments in Pounds

	Mild Steel	Alloy	Nonferrous	Total
1951				
10 Mos.	345,417,847	53,216,142	1,188,513	399,822,502
Jan.	39,219,168	5,062,948	117,909	44,400,025
Feb.	32,887,749	3,904,230	161,662	36,953,641
Mar.	37,338,435	4,923,360	96,008	42,357,803
Apr.	32,645,617	5,247,983	145,126	38,038,726
May	36,370,426	5,940,065	160,091	42,470,582
June	36,393,934	5,320,606	116,032	41,830,571
July	21,498,724	4,880,786	76,882	26,456,392
Aug.	35,788,377	5,865,281	86,127	41,739,785
Sept.	33,906,313	5,663,660	132,120	39,702,093
Oct.	39,369,104	6,407,224	96,556	45,872,884
Nov.	....	....	......	....
Dec.	....	....	......	....
1951	....	....	......	483,800,000*
1950	322,954,832	42,574,710	1,861,686	367,391,228
1949	273,463,740	24,753,807	1,715,362	299,932,909
1948	369,019,831	30,214,928	2,124,496	401,359,255
1947	307,756,495	25,172,382	2,149,768	335,078,645
1946	284,126,356	24,991,208†	....	309,117,564
1945	435,789,217	59,029,938†	....	494,819,155
1944	707,756,964	69,236,137†	....	776,993,101
1943		....	....	971,929,782
1942		....	....	666,965,595
1941		....	....	377,564,483
1940		....	....	198,995,598
1939	....	....	....	152,863,373

† Includes both alloy and nonferrous electrodes. * Estimated.

National Electrical Manufacturers Association.



Blowers and Fans

Shipments—Thousands of Dollars

Qtrs.	1951	1950	1949	1948
1st	29,355	19,382	16,801	14,852
2nd	31,797	28,487	21,069	16,799
3rd	28,804	24,798	19,110	15,490
4th		25,776	15,251	17,354
Total		98,443	72,190	64,495

U. S. Bureau of the Census

Air Washers

Shipments—Thousands of Dollars

Qtrs.	1951	1950	1949	1948
1st	307	210	247	327
2nd	308	425	218	302
3rd	270	269	169	284
4th		578	284	441
Total		1,482	918	1,354

U. S. Bureau of the Census

Unit Heaters

Shipments—Thousands of Dollars

Qtrs.	1951	1950	1949	1948
1st	15,637	7,596	8,518	10,127
2nd	13,999	8,049	6,133	6,827
3rd	14,496	13,519	9,304	9,544
4th		16,467	13,341	12,936
Total		45,631	37,296	39,434

U. S. Bureau of the Census

Air Conditioning, Commercial Refrigeration Equipment

Factory Shipments—Number of Units and Value in Thousands of Dollars

	CONDENSING UNITS		COMPRESSORS, COMPRESSOR UNITS		ICE-MAKING MACHINES	
	Number	Value	Number	Value	Number	Value
1950	858,367	$74,483	954,368	$46,977	11,846	$7,203
1949	610,341	53,534	604,431	29,929	6,902	4,641
1948	841,609	73,443	459,390	33,493	5,947	5,266
1947	1,039,772	98,296	n.a.	34,586	7,822	3,122
1946	755,538	55,379	191,770	15,377	n.a.	n.a.
1945	354,401	36,902	107,340	9,578	2,805	4,044
1944	189,578	21,872	78,925	6,633	3,665	3,351
1940	211,021	18,808	84,889	7,084	1,045	628

	CENTRIFUGAL-REFRIGERATION SYSTEMS		HEAT-EXCHANGER EQUIPMENT		SELF-CONTAINED AIR-CONDITIONING UNITS	
	Number	Value	Number	Value	Number	Value
1950	382	$12,249		$62,008	249,854	$84,842
1949	285	8,189		40,925	123,709	50,584
1948	361	10,351		48,552	111,620	49,008
1947	313	7,814		63,025	74,976	39,509
1946	312	6,593		40,451	47,664	19,500
1945	185	2,994		22,422	14,973	11,230
1944	70	1,736		17,606	n.a.	n.a.
1940	112	2,403		17,110	n.a.	n.a.

U. S. Bureau of the Census

n.a. = Not available

Industrial Control Apparatus

Sales

Qtrs.	1951	1950	1949	1948	1947
1st	$38,268,776	$23,841,436	$24,815,926	$28,239,799	$21,415,731
2nd	46,397,618	27,663,410	27,842,778	29,872,234	26,445,225
3rd		29,872,967	22,869,582	27,289,390	27,962,037
4th		37,821,630	23,992,277	29,865,582	31,294,122
Total		$119,199,443	$99,520,563	$115,267,005	$107,117,115

National Electrical Manufacturers Association

Machinery & Equipment

METALWORKING FACTS AND FIGURES

Motors and Generators

New Orders (Thousands of Dollars)

Polyphase Induc. Motors, 1-200 hp

Qtrs.	1951	1950	1949
1st	64,221	28,236	21,148
2nd	56,573	25,436	18,679
3rd	44,878	46,582	17,715
4th		55,054	18,521
Total		155,308	76,063

DC Generators & Motors, 1-200 hp

Qtrs.	1951	1950	1949
1st	10,666	4,692	5,266
2nd	12,779	6,106	4,997
3rd	9,160	7,428	2,890
4th		10,648	3,747
Total		28,874	16,900

YEARLY TOTALS

Polyphase Induc. Motors, 1-200 hp		DC Generators & Motors, 1-200 hp	
1950	155,308	1950	28,874
1949	76,063	1949	16,900
1948	95,577	1948	22,273
1947	122,043	1947	20,381
1946	142,464	1946	20,942
1945	87,621	1945	37,194
1944	68,555	1944	74,581
1943	84,862	1943	83,494
1942	114,650	1942	94,693
1941	78,357	1941	38,723

National Electrical Mfrs. Assn.

Shipments by Screw Machine Products Industry

Index 1940 = 100

	1951	1950	YEARLY AVERAGES			
Jan.	374	183	1950	240	1938	48
Feb.	353	165	1949	167	1937	93
Mar.	396	193	1948	204	1936	73
Apr.	391	202	1947	219	1935	60
May	362	224	1946	220	1934	42
June	358	227	1945	292	1933	27
July	285	203	1944	400	1932	19
Aug.	303	287	1943	481	1931	29
Sept.	264	266	1942	388	1930	42
Oct.	311	294	1941	221	1929	78
Nov.		300	1940	100	1928	65
Dec.		332	1939	75	1927	46

National Screw Machine Products Association

Electric Industrial Trucks and Tractors

Shipments

	Domestic	Export	Total
1951			
10 Mos.	4,546	578	5,124
Jan.	393	47	440
Feb.	398	63	461
Mar.	519	76	595
Apr.	354	43	397
May	420	44	464
June	519	85	604
July	484	54	538
Aug.	529	62	591
Sept.	385	62	447
Oct.	545	42	587
Nov.			
Dec.			
1950	2,486	322	2,808
Jan.	180	19	199
Feb.	146	37	183
Mar.	196	33	229
Apr.	172	32	204
May	183	20	203
June	238	30	268
July	177	22	199
Aug.	216	21	237
Sept.	234	29	263
Oct.	255	35	290
Nov.	218	24	242
Dec.	271	20	291
1949	2,251	350	2,601
Jan.	184	20	204
Feb.	255	15	270
Mar.	214	33	247
Apr.	142	57	199
May	179	29	208
June	175	30	205
July	133	35	168
Aug.	183	19	202
Sept.	168	17	185
Oct.	235	19	254
Nov.	197	30	227
Dec.	186	46	232
1948	2,904	543	3,447
1947	3,565	566	4,131
1946	2,714	160	2,874
1945	3,627	224	3,851
1944	4,380	395	4,775
1943	4,280	211	4,491
1942	4,365	207	4,572
1941	2,837	254	3,091

U. S. Bureau of the Census

Steel Boilers

New Orders
(100 sq ft or more of heating surface)

GRAND TOTAL—ALL TYPES

	Number	Sq ft
1950	19,795	23,030,614
1949	14,346	13,094,907
1948	16,408	18,419,968
1947	16,110	18,751,755
1946	19,473	22,645,814
1945	13,076	18,372,439
1944	8,670	13,022,626
1943	10,994	25,587,435
1942	15,647	39,570,941
1941	14,454	27,169,993
1940	10,823	18,250,063

STATIONARY BOILERS

	Number	Sq ft
1950	7,827	16,468,567
1949	5,190	8,097,503
1948	6,354	12,628,660
1947	8,140	14,786,298
1946	10,452	18,652,274
1945	7,317	13,244,916
1944	5,006	7,260,313
1943	4,834	5,950,027
1942	6,155	15,656,704
1941	5,253	13,314,573
1940	3,991	9,898,268

MARINE BOILERS

	Number	Sq ft
1950	169	399,998
1949	76	281,999
1948	153	964,106
1947	35	109,753
1946	96	121,705
1945	688	2,653,800
1944	1,312	4,535,814
1943	4,080	18,346,455
1942	4,774	20,771,539
1941	2,123	9,970,792
1940	1,230	5,643,521

STEEL HEATING BOILERS

	Number	Sq ft
1950	11,799	6,162,049
1949	9,080	4,715,400
1948	9,901	4,827,202
1947	7,935	3,855,704
1946	8,925	3,871,835
1945	5,071	2,473,723
1944	2,352	1,226,499
1943	2,080	1,290,953
1942	4,718	3,142,698
1941	7,078	3,884,628
1940	5,602	2,708,274

U. S. Bureau of the Census

Foundry Equipment Shipments

Dollar Volume

	NEW EQUIPMENT			REPAIRS		
	1951	1950	1949	1951	1950	1949
Jan.	1,319,628	735,171	1,213,737	1,051,322	508,831	816,018
Feb.	1,324,955	583,793	1,387,142	980,826	523,501	823,916
Mar.	1,555,705	906,870	955,240	1,193,149	671,463	767,386
Apr.	1,820,795	613,156	998,808	1,123,228	577,569	716,807
May	2,006,515	789,996	950,194	1,175,379	668,547	578,681
June	2,271,729	943,249	1,136,552	1,000,061	739,158	578,198
July	1,748,113	841,733	1,027,326	990,494	773,522	419,055
Aug.	1,906,368	782,165	1,057,651	1,112,325	751,158	509,963
Sept.	2,383,841	839,508	770,185	1,123,380	725,939	574,653
Oct.	2,565,715	1,448,630	979,891	1,326,639	934,456	567,492
Nov.		1,251,705	814,423		850,128	534,669
Dec.		1,467,592	782,906		840,426	514,488
Total		11,203,568	12,074,055		8,564,698	7,401,326

Foundry Equip. Mfrs. Assn.

Orders Placed for New Foundry Equipment

Indexes based on 1937-38-39 monthly average as 100%

	1951		1950		1949		1948	1947
	Dollars	Index	Dollars	Index	Dollars	Index	Index	Index
Jan.	3,075,267	668.0	730,769	159.3	693,747	149.9	380.9	466.9
Feb.	2,940,273	638.6	519,111	113.1	668,095	144.4	367.3	472.5
Mar.	2,757,763	599.0	1,033,585	225.2	882,645	190.8	326.2	532.3
Apr.	2,256,232	490.1	737,119	160.6	797,085	172.0	412.0	445.9
May	1,987,472	431.7	1,353,284	294.9	564,814	121.9	388.5	525.9
June	1,810,435	393.2	2,857,514	622.7	763,920	164.9	376.8	658.9
July	1,796,755	390.3	1,843,821	401.8	679,432	146.6	456.3	426.1
Aug.	1,862,084	404.5	3,182,714	693.6	588,975	127.1	324.7	411.3
Sept.	1,595,440	346.5	2,220,140	483.8	771,864	166.6	273.5	393.1
Oct.	1,714,494	372.4	2,417,290	526.8	618,489	133.5	296.0	438.2
Nov.			4,076,638	885.5	1,250,059	270.4	284.4	286.1
Dec.			2,422,609	526.2	929,343	201.0	243.7	467.8
Total			23,394,994		9,208,468			

Foundry Equip. Mfrs. Assn.

Pumps

(Steam, power, centrifugal, rotary)
New Orders (Thousands of Dollars)

	1951	1950	1949	1948	1947
Jan.	6,477	2,587	3,390	3,819	3,428
Feb.	6,480	2,938	3,247	3,635	3,506
Mar.	7,654	3,313	3,593	4,703	3,464
Apr.	7,583	3,376	2,699	4,312	3,638
May	6,371	3,668	2,775	3,724	2,973
June	6,852	4,153	3,019	3,512	2,999
July	8,358	4,080	3,358	4,075	3,148
Aug.	5,911	6,429	3,767	4,520	3,843
Sept.	6,552	5,191	2,914	3,474	3,355
Oct.	6,506	4,985	2,539	3,571	3,475
Nov.		5,961	2,525	3,580	2,673
Dec.		6,720	2,560	4,263	3,480
Total		53,401	36,386	47,188	39,982

MONTHLY AVERAGES

1950	4,450	1944	3,436
1949	3,032	1943	6,214
1948	3,932	1942	6,155
1947	3,332	1941	3,606
1946	3,105	1940	2,204
1945	2,869	1939	1,352

Hydraulic Institute

EARTHMOVING AND EXCAVATING EQUIPMENT

Manufacturers' Shipments
(Values in Thousands of Dollars)

Wheel-type Heavy Duty Industrial Tractors

	Units	Value
1951	....	......
1st Qtr.	643	$8,629
2nd Qtr.	981	14,774
3rd Qtr.	867	13,768
4th Qtr.	....	......
1950	2,065	$24,769
1st Qtr.	296	3,296
2nd Qtr.	546	6,236
3rd Qtr.	635	7,651
4th Qtr.	588	7,586
1949	1,047	$12,499
1948	1,298	13,962
1947	....	15,791

Road Construction and Maintenance Machinery

	Units	Value
1951	....	......
1st Qtr.	....	$37,670
2nd Qtr.	....	43,318
3rd Qtr.	....	31,042
4th Qtr.	....	......
1950	....	$117,540
1st Qtr.	....	22,814
2nd Qtr.	....	31,114
3rd Qtr.	....	32,334
4th Qtr.	....	31,278
1949	....	$96,883
1948	....	117,908
1947	....	97,272
1946	....	88,610

Construction Machinery for Mounting on Tractors

	Units	Value
1951	....	......
1st Qtr.	....	$16,671
2nd Qtr.	....	18,630
3rd Qtr.	....	12,345
4th Qtr.	....	......
1950	....	$58,769
1st Qtr.	....	10,970
2nd Qtr.	....	14,664
3rd Qtr.	....	17,151
4th Qtr.	....	15,984
1949	....	$38,177
1948	....	44,645
1947	....	40,722

U. S. Bureau of the Census

Power Cranes and Shovels

	Units	Value
1951	....	......
1st Qtr.	1,689	$40,471
2nd Qtr.	1,861	46,736
3rd Qtr.	1,740	43,521
4th Qtr.	....	......
1950	5,108	$109,006
1st Qtr.	1,094	23,287
2nd Qtr.	1,294	26,232
3rd Qtr.	1,303	27,238
4th Qtr.	1,417	32,249
1949	4,114	$89,204
1948	8,289	158,586
1947	8,035	132,836
1946	5,696	81,324

Tracklaying Tractors

	Units	Value
1951	....	......
1st Qtr.	12,426	$67,102
2nd Qtr.	13,645	74,544
3rd Qtr.	8,987	47,094
4th Qtr.	....	......
1950	43,590	$223,042
1st Qtr.	11,798	54,821
2nd Qtr.	13,247	64,090
3rd Qtr.	9,842	53,142
4th Qtr.	8,703	50,989
1949	42,749	$196,622
1948	39,949	167,341
1947	37,624	134,361
1946	25,929	81,356

Portable Well and Blast Hole Drills

	Units	Value
1951	....	......
1st Qtr.	132	$1,082
2nd Qtr.	190	1,379
3rd Qtr.	139	1,627
4th Qtr.	....	......
1950	627	$4,472
1st Qtr.	176	1,285
2nd Qtr.	126	643
3rd Qtr.	106	800
4th Qtr.	220	1,744
1949	807	$6,774
1948	1,641	10,914
1947	2,040	11,426
1946	1,027	5,389

Trucks, Truck Tractors, Trailers and Wagons

OFF-HIGHWAY TYPE

	Units	Value
1951	....	......
1st Qtr.	516	$8,341
2nd Qtr.	694	8,827
3rd Qtr.	609	7,775
4th Qtr.	....	......
1950	1,908	$22,856
1st Qtr.	334	4,016
2nd Qtr.	510	6,206
3rd Qtr.	595	7,325
4th Qtr.	469	5,309

Gear Sales

Indexes of New Orders Placed
Average Month 1935-1939=100

	1951	1950	1949	1948
Jan.	764.6	280.2	320.7	346.8
Feb.	809.1	272.9	282.3	324.4
Mar.	830.7	358.4	299.1	389.8
Apr.	742.5	328.6	339.0	320.9
May	667.1	363.1	250.1	283.6
June	800.9	401.0	227.8	324.1
July	589.1	410.7	193.1	348.4
Aug.	564.2	617.4	262.0	335.6
Sept.	630.1	654.5	224.9	320.4
Oct.	703.4	564.8	242.3	333.3
Nov.		554.9	230.7	309.0
Dec.		680.4	242.8	325.9

MONTHLY AVERAGES

1951*	710.0	1945	242.3	1939	102.4
1950	457.2	1944	262.2	1938	76.3
1949	259.6	1943	366.4	1937	139.8
1948	330.2	1942	350.3	1936	107.8
1947	313.4	1941	287.5	1935	73.7
1946	298.7	1940	150.4		

* Estimated
American Gear Manufacturers Association

Electric Industrial Furnaces

New Orders

	Units	Kilowatts	Value
1951			
10 Mos	7,992	287,952	$38,515,831
January	686	18,512	2,764,252
February	907	23,253	3,211,657
March	780	32,409	4,846,290
April	718	31,712	3,656,642
May	926	32,171	4,766,008
June	731	39,480	3,369,767
July	895	36,909	5,587,318
August	895	28,768	3,891,339
September	679	21,680	3,250,077
October	775	23,058	3,172,481
November			......
December			......
1950	5,891	127,178	$13,880,665
January	365	4,353	473,238
February	383	7,475	697,232
March	415	5,226	753,448
April	289	3,619	414,801
May	405	7,514	981,502
June	637	9,356	1,327,580
July	533	9,114	1,444,519
August	506	7,245	1,038,631
September	557	21,213	1,485,237
October	612	13,078	1,602,878
November	596	25,928	2,156,510
December	593	13,357	1,505,089
1949	4,664	48,525	5,284,021
1948	3,942	55,068	5,836,410

Industrial Furnace Mfrs. Assn. Inc.

Fuel Fired Industrial Furnaces

(Except for hot rolling steel mills)
New Orders

	Units	Value
1951		
10 Mos	2,144	$53,870,591
January	216	4,015,702
February	219	4,687,247
March	261	7,019,330
April	251	8,497,273
May	184	5,043,515
June	165	6,259,378
July	189	5,302,979
August	244	4,850,393
September	207	1,820,903
October	208	6,373,871
November	...	......
December	...	......
1950	1,508	$22,338,382
January	128	1,966,634
February	64	616,075
March	97	1,306,383
April	68	819,160
May	110	1,410,719
June	146	1,165,757
July	114	2,246,594
August	171	3,926,788
September	216	1,817,055
October	147	2,299,989
November	114	2,074,725
December	133	2,748,503
1949	800	6,391,107
1948	1,242	10,598,992

Industrial Furnace Mfrs. Assn. Inc.

Batteries Shipped

Automotive Replacement Only—Thousands

	1951	1950	1949	1948
January	1,873	1,467	1,243	2,394
February	1,390	1,174	826	2,254
March	1,113	1,191	560	1,679
April	1,790	915	499	1,211
May	1,400	1,196	685	1,027
June	1,366	1,646	1,059	1,200
July	1,611	2,060	1,637	1,596
August	2,118	2,839	2,618	2,519
September	2,055	2,925	2,786	2,643
October	2,493	3,007	2,573	2,845
November	2,800*	2,530	2,132	2,541
December	2,500*	2,172	1,691	1,906

YEARLY TOTALS

1950	23,128	1947	24,441
1949	18,342	1946	17,522
1948	23,725	1945	17,560

Association of American Battery Manufacturers Inc.
* Estimated

Rigid Steel Conduit and Fittings

(Shipments—Net Tons)

	1951	1950	1949	1948
Jan.	25,055	15,674	22,705	20,882
Feb.	23,389	16,100	21,630	22,730
Mar.	28,590	17,708	24,590	23,194
Apr.	27,464	16,515	21,931	24,653
May	27,891	17,219	17,566	22,415
June	27,749	21,645	13,240	22,704
July	23,890	24,723	12,568	23,072
Aug.	25,017	30,543	12,400	19,241
Sept.	25,941	29,123	14,992	22,456
Oct.	26,680	25,875	17,683	24,588
Nov.		24,489	12,662	27,650
Dec.		27,561	20,946	28,113

YEARLY TOTALS

1950	267,175	1947	258,134
1949	212,913	1946	198,144
1948	281,698	1945	127,732

Office of Business Economics

Farm Equipment

DOMESTIC WATER SYSTEMS

Factory Shipments

Jet Pump Systems

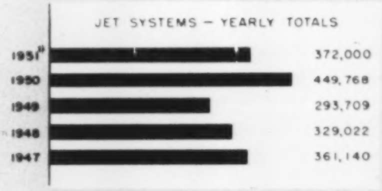
	Units	Value
1951*	372,000	....
Jan.	40,362	$3,988,000
Feb.	44,500	4,337,000
Mar.	42,186	4,161,000
Apr.	35,507	3,543,000
May	30,168	2,957,000
June	24,035	2,352,000
July	22,771	2,279,000
Aug.	27,701	2,842,000
Sept.	27,691	2,726,000
Oct.	33,556	3,352,000
1950	449,768	$38,935,000
Jan.-June	190,756	16,035,000
July	42,750	3,641,000
Aug.	45,964	4,029,000
Sept.	46,968	4,181,000
Oct.	47,388	4,288,000
Nov.	39,411	3,490,000
Dec.	36,531	3,271,000
1949	293,709	$24,383,966
1948	329,022	27,518,184
1947	361,140	29,694,040
1946	318,758	24,134,614
1945	175,652	12,475,083

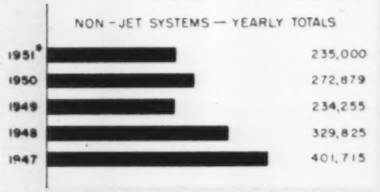
Non-Jet Pump Systems

	Units	Value
1951*	235,000	....
Jan.	21,334	$1,996,000
Feb.	25,279	2,180,000
Mar.	24,868	2,196,000
Apr.	24,533	2,349,000
May	23,089	2,042,000
June	17,877	1,635,000
July	15,251	1,464,000
Aug.	17,784	1,705,000
Sept.	17,177	1,677,000
Oct.	19,941	1,903,000
1950	272,879	$21,269,000
Jan.-June	125,767	9,400,000
July	24,174	1,836,000
Aug.	30,282	2,347,000
Sept.	26,673	2,110,000
Oct.	26,275	2,087,000
Nov.	20,786	1,790,000
Dec.	18,922	1,699,000
1949	234,255	$17,492,313
1948	329,825	23,653,435
1947	401,715	26,122,759
1946	306,971	16,639,422
1945	214,478	11,082,266

U. S. Bureau of the Census

* Estimated





Domestic Hand and Windmill Pumps

Factory Shipments

1951	Units	Value
Jan	29,072	$197,000
Feb	30,871	227,000
Mar	28,691	215,000
Apr	20,160	167,000
May	15,071	112,000
June	16,443	100,000
July	16,237	93,000
Aug.	18,653	115,000
Sept	21,787	123,000
Oct.	22,878	145,000
1950	334,357	$1,941,000
Jan.-June	170,740	938,000
July	24,678	145,000
Aug	33,868	188,000
Sept	28,847	168,000
Oct.	26,726	179,000
Nov	30,129	182,000
Dec	19,369	141,000

YEARLY TOTALS

1950	334,357	$1,941,000
1949	327,415	2,186,000
1948	456,650	2,892,000
1947	368,532	2,322,000
1946	313,023	1,623,000
1945	314,638	1,689,000
1944	380,240	1,955,000
1943	368,249	1,730,000
1942	377,331	1,631,000
1941	490,586	1,896,000
1940	420,941	1,553,000
1939	515,083	1,579,000
1938	383,131	1,337,000
1937	497,498	1,678,000
1936	531,356	1,742,000
1935	367,008	1,152,000
1934	388,840	1,200,000
1933	331,004	869,000
1932	225,736	766,000
1931	325,611	1,337,000
1930	395,166	2,079,000
1929	450,287	2,344,000
1928	465,824	2,310,000
1927	452,030	2,298,000
1926	699,994	3,466,000
1925	888,172	4,243,000
1924	742,788	4,063,000
1923	966,116	5,640,000
1922	825,669	4,132,000

U. S. Bureau of the Census

Pump Jacks

Factory Shipments

1951	Units	Value
Jan	5,400	$140,000
Feb	4,401	126,000
Mar	4,321	140,000
Apr	4,512	150,000
May	2,470	78,000
June	2,463	76,000
July	2,321	76,000
Aug	2,936	99,000
Sept	2,300	68,000
Oct	2,116	65,000
Nov.	.....	......
Dec.	.....	......
1950	43,237	$1,187,000
Jan.-June	21,689	566,000
July	2,716	79,000
Aug.	4,385	123,000
Sept.	3,947	113,000
Oct	3,826	109,000
Nov.	3,088	90,000
Dec.	3,586	107,000

YEARLY TOTALS

1950	43,237	$1,187,000
1949	36,854	1,034,000
1948	41,952	1,083,000
1947	54,187	1,450,000
1946	89,460	2,257,000
1945	62,451	1,418,000
1944	56,550	1,230,000
1943	31,065	640,000
1942	55,665	906,000
1941	59,058	856,000
1940	47,842	630,000
1939	37,133	464,000
1938	30,198	362,000
1937	37,029	425,000
1936	35,163	300,000
1935	20,800	161,000
1934	n.a.	n.a.
1933	n.a.	n.a.
1932	n.a.	n.a.
1931	24,803	215,000
1930	40,269	320,000
1929	42,850	361,000
1928	42,518	364,000
1927	39,665	367,000
1926	45,050	381,000
1925	57,438	487,000
1924	41,634	357,000
1923	53,540	458,000
1922	46,156	331,000

n.a.—Not available.
U. S. Bureau of the Census

Windmill Towers

Factory Shipments

1951	Units	Value
Jan	789	$71,000
Feb	933	81,000
Mar	1,171	107,000
Apr	926	81,000
May	632	55,000
June	599	51,000
July	716	63,000
Aug	935	81,000
Sept	801	72,000
Oct	817	73,000
Nov	.....	......
Dec	.....	......
1950	9,092	$788,000
Jan-June	4,006	381,000
July	837	62,000
Aug	975	76,000
Sept	995	79,000
Oct	741	60,000
Nov	991	85,000
Dec	547	45,000

YEARLY TOTALS

1950	9,092	$788,000
1949	9,843	901,000
1948	19,115	1,430,000
1947	22,269	1,351,000
1946	22,416	1,043,000
1945	20,603	863,000
1944	18,236	727,000
1943	11,632	480,000
1942	11,373	468,000
1941	14,950	670,000
1940	14,647	641,000
1939	17,418	808,000
1938	16,898	662,000
1937	20,992	895,000
1936	22,366	815,000
1935	17,015	627,000
1934	n.a.	n.a.
1933	n.a.	n.a.
1932	n.a.	n.a.
1931	11,357	445,000
1930	26,058	1,009,000
1929	35,894	1,355,000
1928	50,215	1,433,000
1927	44,334	1,330,000
1926	57,571	1,397,000
1925	53,848	1,569,000
1924	42,312	1,252,000
1923	40,753	1,373,000
1922	35,293	1,383,000

n.a.—Not available.
U. S. Bureau of the Census

Windmill Heads

Factory Shipments

1951	Units	Value
Jan	1,487	$133,000
Feb	1,751	154,000
Mar	1,857	176,000
Apr	1,760	156,000
May	1,220	96,000
June	1,092	103,000
July	1,258	119,000
Aug	1,456	118,000
Sept.	1,380	125,000
Oct.	1,438	138,000
Nov.	.....	......
Dec.	.....	......
1950	20,736	$1,674,000
Jan-June	9,988	733,000
July	1,998	155,000
Aug.	2,023	175,000
Sept.	2,096	192,000
Oct.	1,523	138,000
Nov.	1,949	172,000
Dec.	1,159	109,000

YEARLY TOTALS

1950	20,736	$1,674,000
1949	19,188	1,675,000
1948	31,835	2,183,000
1947	39,076	2,424,000
1946	46,004	2,113,000
1945	41,761	1,786,000
1944	40,540	1,699,000
1943	34,523	1,537,000
1942	37,642	1,624,000
1941	43,159	1,757,000
1940	45,787	1,755,000
1939	52,706	2,100,000
1938	46,455	1,923,000
1937	63,753	2,529,000
1936	70,125	2,508,000
1935	51,513	1,884,000
1934	57,836	1,981,000
1933	n.a.	n.a.
1932	n.a.	n.a.
1931	37,523	1,295,000
1930	69,793	2,554,000
1929	94,030	3,949,000
1928	99,050	3,944,000
1927	83,866	3,503,000
1926	82,265	3,129,000
1925	95,032	3,864,000
1924	76,817	3,331,000
1923	70,327	2,771,000
1922	71,262	2,809,000

n.a.—Not available.
U. S. Bureau of the Census

Farm Equipment

FARM MACHINERY AND EQUIPMENT

Manufacturers' Shipments

U. S. Bureau of the Census

Complete Units—Totals

	Total	Domestic	Export
1950	$1,437,587,000	$1,258,119,000	$179,468,000
1949	1,424,068,000	1,219,220,000	204,848,000
1948	1,334,345,000	1,162,306,000	172,039,000
1947	975,988,126	852,037,940	123,950,186
1946	622,673,570	557,568,157	65,105,413
1945	490,504,558	426,552,593	63,951,965
1944	432,047,723	386,127,862	45,919,861
1943	202,061,512	178,195,605	23,865,907

COMPLETE UNITS—BY PRODUCT GROUPS

Plows and Listers

	Total	Domestic	Export
1950	$67,119,000	$56,579,000	$10,540,000
1949	66,694,000	52,812,000	13,882,000
1948	67,353,000	57,332,000	10,021,000
1947	52,596,324	45,439,275	7,157,049
1946	30,585,670	26,968,841	3,616,829
1945	22,116,982	18,926,438	3,190,544
1944	18,380,210	16,095,878	2,284,332
1943	8,987,133	7,325,042	1,662,091

Harrows, Rollers, Pulverizers, Stalk Cutters

	Total	Domestic	Export
1950	$68,109,000	$62,199,000	$5,910,000
1949	66,939,000	60,709,000	6,230,000
1948	71,478,000	67,677,000	3,801,000
1947	47,731,481	42,796,049	4,935,432
1946	29,197,577	27,810,881	1,386,696
1945	17,170,119	16,097,799	1,072,320
1944	16,899,291	16,141,245	758,546
1943	6,653,593	6,330,983	322,610

Planting, Seeding, and Fertilizing Machinery

	Total	Domestic	Export
1950	$91,429,000	$87,013,000	$4,416,000
1949	89,166,000	85,371,000	3,795,000
1948	87,505,000	83,844,000	3,661,000
1947	57,678,819	54,743,355	2,935,464
1946	41,683,390	40,395,600	1,287,790
1945	32,055,195	30,869,192	1,186,003
1944	26,003,969	24,700,059	1,303,910
1943	9,069,269	8,604,266	465,003

Cultivators and Weeders

	Total	Domestic	Export
1950	$43,243,000	$40,058,000	$3,185,000
1949	52,518,000	48,820,000	3,698,000
1948	57,361,000	53,710,000	3,651,000
1947	36,101,723	33,906,154	2,195,569
1946	23,291,144	22,117,244	1,173,900
1945	23,486,010	22,002,201	1,483,809
1944	22,149,353	21,318,628	830,725
1943	9,605,473	9,175,315	430,158

Sprayers and Dusters

	Total	Domestic	Export
1950	$31,424,000	$27,266,000	$4,158,000
1949	27,574,000	24,357,000	3,217,000
1948	39,158,000	34,406,000	4,752,000
1947	34,793,025	30,921,780	3,871,245
1946	23,352,657	21,382,580	1,970,077
1945	12,226,475	11,436,951	789,524
1944	10,840,828	10,077,078	763,750
1943	6,779,005	6,513,791	265,214

Harvesting Machinery

	Total	Domestic	Export
1950	$241,642,000	$221,543,000	$20,099,000
1949	232,933,000	213,603,000	19,330,000
1948	189,937,000	172,691,000	17,246,000
1947	140,946,122	127,681,459	13,264,663
1946	75,969,443	70,426,481	5,542,962
1945	65,631,426	60,827,560	4,803,866
1944	51,600,575	48,083,068	3,517,507
1943	27,167,074	25,077,297	2,089,777

Haying Machinery

	Total	Domestic	Export
1950	$132,355,000	$125,303,000	$7,052,000
1949	127,847,000	118,064,000	9,783,000
1948	127,529,000	118,132,000	9,397,000
1947	72,506,586	67,446,450	5,060,136
1946	44,535,342	42,012,807	2,522,535
1945	33,662,612	31,786,341	1,876,271
1944	31,029,859	29,823,550	1,206,309
1943	12,337,963	11,583,258	754,705

Machines for Preparing Crops for Market or for Use

	Total	Domestic	Export
1950	$22,007,000	$18,782,000	$3,225,000
1949	24,724,000	21,291,000	3,433,000
1948	30,801,000	26,874,000	3,927,000
1947	32,615,682	29,738,585	2,877,097
1946	27,939,738	26,170,212	1,769,526
1945	18,105,070	17,231,361	873,709
1944	16,221,950	15,492,631	729,319
1943	9,791,847	9,431,613	360,234

Farm Poultry Equipment

	Total	Domestic	Export
1950	$26,858,000	$26,206,000	$652,000
1949	23,020,000	22,240,000	780,000
1948	18,738,000	17,919,000	819,000
1947	19,156,835	18,283,341	873,494
1946	22,284,761	21,559,062	725,699
1945	22,600,662	22,362,480	238,182
1944	19,209,782	19,030,217	179,565
1943	16,648,955	16,421,217	227,738

Farm Dairy Machines and Equipment

	Total	Domestic	Export
1950	$14,624,000	$13,462,000	$1,162,000
1949	13,621,000	11,896,000	1,725,000
1948	17,246,000	15,102,000	2,144,000
1947	24,654,642	22,143,586	2,511,056
1946	32,199,747	30,136,990	2,062,757
1945	34,056,429	32,804,454	1,251,975
1944	25,543,623	24,381,455	1,162,168
1943	16,766,354	15,812,177	954,177

Barn Equipment

	Total	Domestic	Export
1950	$10,034,000	$10,014,000	$ 20,000
1949	8,154,000	8,134,000	20,000
1948	12,195,000	12,174,000	21,000
1947	10,901,480	10,893,727	7,753
1946	8,640,207	8,633,523	6,684
1945	6,005,136	6,002,788	2,348
1944	5,975,307	5,972,458	2,849
1943	3,953,640	3,953,550	90

Barnyard Equipment

	Total	Domestic	Export
1950	$17,091,000	$17,056,000	$35,000
1949	13,102,000	13,059,000	43,000
1948	10,721,000	10,691,000	30,000
1947	8,621,632	8,599,384	22,248
1946	8,648,055	8,536,254	111,801
1945	7,861,272	7,855,047	6,225
1944	6,978,793	6,966,041	12,752
1943	3,880,399	3,879,854	545

Farm Elevators and Blowers

	Total	Domestic	Export
1950	$30,605,000	$29,755,000	$850,000
1949	29,122,000	28,669,000	453,000
1948	22,313,000	22,200,000	113,000
1947	14,298,722	14,169,363	129,359
1946	8,535,790	8,483,852	51,938
1945	5,463,754	5,442,827	20,927
1944	3,675,954	3,665,985	9,969
1943	2,576,155	2,576,155	

Farm Wagons, Trucks, and Other Farm Transportation Equipment

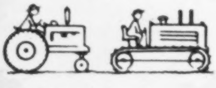
	Total	Domestic	Export
1950	$20,975,000	$19,461,000	$1,514,000
1949	20,140,000	18,870,000	1,270,000
1948	34,306,000	32,562,000	1,744,000
1947	31,173,525	28,973,090	2,200,435
1946	23,970,305	23,423,231	547,074
1945	12,485,216	12,142,120	343,096
1944	7,385,187	7,294,177	91,010
1943	3,814,853	3,792,791	22,062

Tractors for Farm Use

	Total	Domestic	Export
1950	$620,072,000	$503,422,000	$116,650,000
1949	628,514,000	491,325,000	137,189,000
1948	547,704,000	436,992,000	110,712,000
1947	392,211,528	316,302,342	75,909,186
1946	221,839,744	179,510,599	42,329,145
1945	177,578,200	130,765,034	46,813,166
1944	170,152,542	137,085,392	33,067,150
1943	64,029,799	47,718,296	16,311,503

TRACTORS

Manufacturers' Shipments



U. S. Bureau of the Census

WHEEL TYPE—Farm Use

Year	Number	Value
1950	490,226	$534,863,000
1949	534,946	543,006,000
1948	510,847	468,083,292
1947	413,783	331,652,526
1946	243,271	180,362,770
1945	224,985	153,170,002
1944	235,153	157,518,924
1943	94,550	55,943,850

WHEEL TYPE—Non-Farm Use

Year	Number	Value
1950	9,378	$38,921,000
1949	10,422	29,425,000
1948	18,845	29,215,151
1947	14,882	17,681,997
1946	12,067	11,909,354
1945	18,707	15,725,730
1944	14,502	12,593,984
1943	9,317	7,272,952

Farm Equipment

METALWORKING FACTS AND FIGURES

Attachments and Parts—Totals

	Total	Domestic	Export
1950	$357,807,000	$306,799,000	$51,008,000
1949	388,940,000	331,714,000	57,226,000
1948	399,401,000	351,307,000	48,094,000
1947	318,697,725	280,647,520	38,050,205
1946	227,804,033	205,662,331	22,141,702
1945	209,672,797	186,042,806	23,629,991
1944	185,332,814	163,182,909	22,149,905
1943	141,579,498	123,386,285	18,193,213

Farm Machinery and Equipment

	Total	Domestic	Export
1950	$1,795,394,000	$1,564,918,000	$230,476,000
1949	1,813,008,000	1,550,934,000	262,074,000
1948	1,733,746,000	1,513,613,000	220,133,000
1947	1,294,685,851	1,132,685,460	162,000,391
1946	850,477,603	763,230,488	87,247,115
1945	700,177,355	612,595,399	87,581,956
1944	617,380,537	549,310,771	68,069,766
1943	343,641,010	301,581,890	42,059,120

ATTACHMENTS AND PARTS—BY PRODUCT GROUPS

Plows and Listers

	Total	Domestic	Export
1950	$32,839,000	$29,532,000	$3,307,000
1949	33,280,000	29,575,000	3,705,000
1948	33,252,000	30,238,000	3,014,000
1947	30,932,933	28,106,130	2,826,803
1946	20,107,832	18,846,348	1,261,484
1945	18,045,596	16,446,673	1,598,923
1944	17,505,518	15,915,945	1,589,573
1943	16,209,823	14,922,340	1,287,483

Harrows, Rollers, Pulverizers, Stalk Cutters

	Total	Domestic	Export
1950	$9,597,000	$8,557,000	$1,040,000
1949	9,921,000	9,089,000	832,000
1948	9,476,000	9,071,000	405,000
1947	9,691,421	9,154,751	536,670
1946	7,436,387	7,153,826	282,561
1945	5,428,470	5,278,585	149,885
1944	5,614,332	5,384,992	229,340
1943	4,170,044	3,973,835	196,209

Planting, Seeding, and Fertilizing Machinery

	Total	Domestic	Export
1950	$21,624,000	$20,455,000	$1,169,000
1949	25,709,000	24,000,000	1,709,000
1948	22,000,000	21,079,000	921,000
1947	16,298,538	15,202,033	1,096,505
1946	12,154,142	11,693,405	460,737
1945	11,230,810	10,785,620	445,190
1944	9,106,246	8,733,305	372,941
1943	7,288,846	7,060,015	228,831

Cultivators and Weeders

	Total	Domestic	Export
1950	$13,839,000	$12,808,000	$1,031,000
1949	17,651,000	16,401,000	1,250,000
1948	22,708,000	21,512,000	1,196,000
1947	14,261,456	13,522,678	738,778
1946	10,650,655	10,307,610	343,045
1945	10,080,756	9,708,607	372,149
1944	8,563,455	8,284,121	279,334
1943	6,566,148	6,376,923	189,225

Sprayers and Dusters

	Total	Domestic	Export
1950	$5,535,000	$4,793,000	$742,000
1949	4,585,000	3,967,000	618,000
1948	5,300,000	4,698,000	602,000
1947	4,762,486	4,401,061	361,425
1946	2,927,284	2,600,123	327,161
1945	2,488,806	2,259,214	229,592
1944	2,243,889	2,050,993	192,896
1943	1,587,044	1,502,583	84,461

Harvesting Machinery

	Total	Domestic	Export
1950	$46,511,000	$41,874,000	$4,637,000
1949	57,622,000	52,371,000	5,251,000
1948	57,883,000	53,755,000	4,128,000
1947	50,624,285	47,000,990	3,623,295
1946	37,755,724	35,515,105	2,240,619
1945	33,729,501	31,442,483	2,287,018
1944	28,185,173	26,504,864	1,680,309
1943	22,103,512	20,559,752	1,543,760

Haying Machinery

	Total	Domestic	Export
1950	$22,624,000	$21,257,000	$1,367,000
1949	23,944,000	22,382,000	1,562,000
1948	25,866,000	24,103,000	1,763,000
1947	22,358,038	20,471,525	1,886,513
1946	15,319,554	14,338,547	981,007
1945	15,793,396	14,672,695	1,120,701
1944	13,712,958	12,755,768	957,190
1943	13,777,560	12,799,308	978,252

Machines for Preparing Crops for Market or for Use

	Total	Domestic	Export
1950	$8,545,000	$7,473,000	$1,072,000
1949	10,659,000	9,460,000	1,199,000
1948	11,415,000	10,178,000	1,237,000
1947	9,396,860	8,397,290	999,570
1946	8,106,300	7,372,080	734,220
1945	7,124,969	6,499,718	625,251
1944	5,089,611	4,766,183	323,428
1943	4,774,756	4,490,253	284,503

Farm Poultry Equipment

	Total	Domestic	Export
1950	$3,269,000	$3,221,000	$48,000
1949	2,325,000	2,266,000	59,000
1948	1,641,000	1,604,000	37,000
1947	1,444,721	1,402,588	42,133
1946	1,640,531	1,612,933	27,598
1945	2,267,163	2,248,993	18,170
1944	2,116,611	2,067,958	48,653
1943	1,340,503	1,325,789	14,714

Farm Dairy Machines and Equipment

	Total	Domestic	Export
1950	$8,345,000	$7,443,000	$902,000
1949	6,436,000	5,639,000	797,000
1948	6,197,000	5,501,000	696,000
1947	6,760,753	6,054,092	706,661
1946	9,352,856	8,350,156	1,002,700
1945	12,695,795	12,023,449	672,346
1944	10,583,569	9,890,591	692,978
1943	8,257,402	7,810,951	446,451

Barn Equipment

	Total	Domestic	Export
1950	$1,774,000	$1,769,000	$5,000
1949	1,896,000	1,893,000	3,000
1948	1,012,000	1,012,000	......
1947	901,075	900,551	524
1946	913,416	913,192	224
1945	1,081,712	1,081,649	63
1944	1,010,270	1,009,881	389
1943	882,015	881,768	247

Barnyard Equipment

	Total	Domestic	Export
1950	$686,000	$683,000	$3,000
1949	396,000	396,000	......
1948	194,000	194,000	......
1947	185,881	185,770	111
1946	196,352	195,725	627
1945	225,766	225,441	325
1944	204,966	204,594	372
1943	171,646	171,641	5

Farm Elevators and Blowers

	Total	Domestic	Export
1950	$4,077,000	$4,011,000	$66,000
1949	3,613,000	3,572,000	41,000
1948	2,998,000	2,973,000	25,000
1947	2,090,072	2,074,385	15,687
1946	2,059,535	2,057,593	1,942
1945	680,838	677,533	3,305
1944	908,784	906,426	2,358
1943	918,393	901,338	17,055

Farm Wagons, Trucks, and Other Farm Transportation Equipment

	Total	Domestic	Export
1950	$5,164,000	$4,823,000	$341,000
1949	4,199,000	3,936,000	263,000
1948	4,612,000	4,337,000	275,000
1947	4,840,844	4,572,705	268,139
1946	4,500,040	4,284,631	215,409
1945	3,378,514	3,290,915	87,599
1944	3,527,750	3,380,382	147,368
1943	2,870,165	2,815,399	54,766

Tractors for Farm Use

	Total	Domestic	Export
1950	$173,378,000	$138,100,000	$35,278,000
1949	186,704,000	146,767,000	39,937,000
1948	194,847,000	161,052,000	33,795,000
1947	144,148,362	119,200,971	24,947,391
1946	94,683,425	80,421,057	14,262,368
1945	85,420,705	69,401,231	16,019,474
1944	76,959,682	61,326,906	15,632,776
1943	50,661,641	37,794,390	12,867,251

TRACKLAYING TYPE—Farm Use

Year	Number	Value
1950	18,978	$62,960,000
1949	20,043	64,481,432
1948	17,365	49,569,066
1947	11,630	28,332,401
1946	8,898	18,117,637
1945	11,149	20,973,907
1944	6,221	10,414,553
1943	2,906	6,688,395

TRACKLAYING TYPE—Non-Farm Use

Year	Number	Value
1950	25,622	$160,527,000
1949	23,806	134,941,835
1948	22,208	112,437,953
1947	25,904	105,997,470
1946	17,367	64,816,042
1945	32,849	191,033,573
1944	38,966	250,168,422
1943	27,746	135,506,932

GARDEN TYPE—Farm and Non-Farm

Year	Number	Value
1950	153,827	$22,249,000
1949	131,427	21,028,000
1948	169,421	30,052,000
1947	172,252	33,151,065
1946	115,241	23,925,724
1945	27,962	3,593,299
1944	16,552	2,298,853
1943	9,610	1,411,196

Transportation

AUTOMOBILE PRODUCTION UNITED STATES AND CANADA

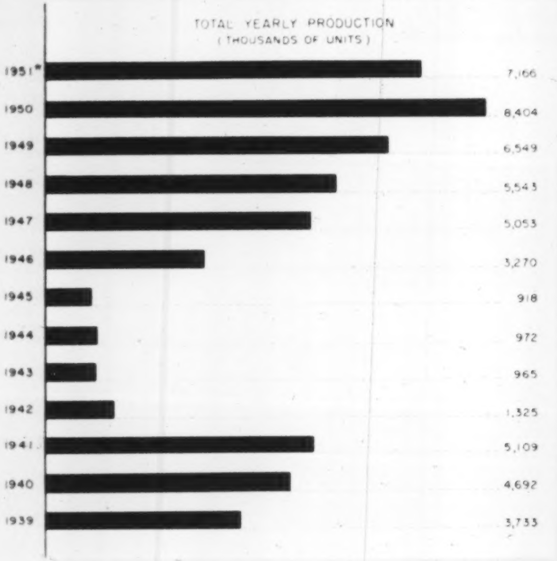
1951	Passenger Cars	Trucks	Total
Jan.	525,038	136,554	661,592
Feb.	535,517	122,137	657,654
Mar.	639,723	152,122	791,845
Apr.	535,270	147,691	682,961
May	536,344	152,878	689,222
June	508,845	143,850	652,695
July	404,726	121,232	525,958
Aug.	444,634	130,558	575,192
Sept.	378,928	116,607	495,535
Oct.	432,291	118,398	550,689
Nov.	376,855	103,468	480,323
Dec.	......	......	......

1950	Passenger Cars	Trucks	Total
Jan.	518,639	104,896	623,535
Feb.	403,612	98,844	502,456
Mar.	490,787	118,465	609,252
Apr.	474,086	111,102	585,188
May	608,443	132,965	741,408
June	749,800	146,776	896,576
July	629,129	121,809	750,938
Aug.	703,277	143,603	846,880
Sept.	637,775	113,033	750,808
Oct.	684,781	119,552	804,333
Nov.	529,197	104,401	633,598
Dec.	524,891	134,204	659,095

YEARLY PRODUCTION

Year	Passenger Cars	Trucks	Total
1951*	5,632,000	1,534,000	7,166,000
1950	6,954,417	1,449,650	8,404,067
1949	5,319,086	1,230,093	6,549,179
1948	4,078,009	1,465,291	5,543,300
1947	3,723,233	1,329,290	5,052,523
1946	2,247,795	1,021,963	3,269,758
1945	85,654	832,017	917,671
1944	....	972,000	972,000
1943	....	965,400	965,400
1942	218,872	1,106,153	1,325,025
1941	3,838,345	1,270,647	5,108,992
1940	3,802,239	890,128	4,692,367
1939	2,975,165	757,553	3,732,718

Ward's Automotive Reports * Estimated



U. S. Bus Production

	1951	1950	1949	1948
January	961	219	658	1,382
February	521	133	418	1,101
March	829	199	545	1,430
April	819	268	514	1,056
May	742	412	564	1,288
June	838	598	632	1,068
July	665	597	439	1,012
August	783	457	444	771
September	743	423	298	1,141
October	1,174	553	322	679
November		584	308	545
December		664	369	824

YEARLY TOTALS

1950	4,907	1944	5,790
1949	5,511	1943	1,613
1948	12,296	1942	8,337
1947	19,110	1941	7,626
1946	10,061	1940	6,147
1945	9,500		

Automobile Manufacturers Association

New Transit Equipment Delivered

	Surface Cars	Subway & Elevated Cars	Trolley Coaches	Motor Busses	Total
1951					
10 Mos	56	118	500	4,400	5,074
1950	4	199	179	2,668	3,050
1949	273	415	680	3,358	4,726
1948	478	248	1,430	7,009	9,165
1947	626	2	955	12,029	13,612
1946	421	0	266	6,463	7,150
1945	332	0	161	4,441	4,934
1944	284	0	60	3,807	4,151
1943	32	0	116	1,251	1,399
1942	284	0	356	7,200	7,840
1941	462	0	227	5,600	6,289
1940	463	189	618	3,984	5,254

American Transit Association

TRUCK TRAILERS

PRODUCTION, By Types of Trailers

	Vans	Tanks	Pole, Pipe & Logging	Platforms	Low-Bed Heavy Haulers	Dump Trailers	All Other	Trailer Chassis Only	Total Production Units	Shipments Units	Shipments Value
1951											
10 Mos	28,818	4,855	2,683	11,569	3,227	1,152	2,967	2,738	58,009	56,201	$210,533,000
Jan	3,952	410	232	1,101	159	110	301	218	6,483	6,376	23,160,000
Feb	3,669	422	209	898	159	103	381	203	6,044	5,852	20,980,000
Mar	3,950	530	352	1,008	230	103	636	293	7,102	7,058	24,550,000
Apr	3,459	449	340	1,146	212	122	271	352	6,351	5,798	20,850,000
May	3,613	550	354	1,174	432	109	297	332	6,861	5,936	22,451,000
June	2,685	512	307	1,216	224	131	255	261	5,591	4,972	19,701,000
July	1,984	405	240	1,101	441	109	136	232	4,648	4,758	18,779,000
Aug	1,697	454	257	1,325	384	123	235	288	4,763	5,200	20,167,000
Sept	1,599	516	193	1,282	455	114	185	254	4,598	4,643	18,312,000
Oct	2,210	607	199	1,318	531	128	270	305	5,568	5,608	21,583,000
Nov											
Dec											
1950	38,008	3,982	2,512	11,418	1,758	908	3,371	2,344	64,617†	65,966	$229,685,000
Jan	1,842	241	114	490	76	32	174	114	3,107	3,173	10,916,000
Feb	2,123	242	94	592	84	27	186	145	3,517	3,573	12,414,000
Mar	2,523	322	136	836	121	34	211	212	4,421	4,509	15,438,000
Apr.	2,528	283	135	794	152	87	213	193	4,411	4,511	15,437,000
May	2,782	288	183	906	168	78	245	217	4,893	5,006	17,226,000
June	3,203	298	255	1,051	190	75	265	195	5,558	5,640	18,792,000
July	3,316	321	290	1,055	143	91	389	193	5,824	6,200	21,188,000
Aug	3,735	377	328	1,312	163	146	374	179	6,642	7,236	24,785,000
Sept	3,944	380	279	1,258	168	63	441	237	6,798	6,820	23,258,000
Oct	3,969	422	284	1,171	182	104	372	237	6,769	6,686	24,108,000
Nov	3,937	410	231	1,039	150	75	282	242	6,394	6,403	23,114,000
Dec	4,106	398	183	914	161	96	219	180	6,283	6,209	23,009,000

YEARLY TOTALS

	Production Units	Shipments Units	Shipments Value
1950	64,617	65,966	$229,685,000
1949	33,097	34,273	119,098,000
1948	44,478	46,960	139,996,000
1947	53,096	55,372	138,383,093
1946	76,234	73,001	151,384,063

PRODUCTION UNITS

"C"—Civilian "M"—Military

1945	33,266-C 83,967-M	1942	8,408-C 71,520-M
1944	24,092-C 185,349-M	1941	41,869
1943	8,054-C 188,811-M	1940	27,118
		1939	24,182
		1937	21,747
		1935	18,898

† Totals for 1950 are revised but figures for the breakdown by types are not

U. S. Bureau of the Census

Merchant Ship Construction

Steel self-propelled vessels of 2000 gross tons and over built in private U. S. yards†

Year	No.	Gross Tonnage	Year	No.	Gross Tonnage
1950	26	415,499	1939	28	241,052
1949	34	538,873	1938	26	185,658
1948	29	164,482	1937	15	121,852
1947	50	286,473	1936	8	63,428
1946	88	672,554	1935	2	19,022
1945	1,067	7,663,362	1934	2	9,544
1944	1,463	11,404,404	1933	4	49,527
1943	1,661	12,499,873	1932	15	145,470
1942	724	5,392,953	1931	14	150,949
1941	95	749,105	1930	16	151,208
1940	53	444,727	1929	7	57,395

TYPES OF VESSELS CONSTRUCTED—1950

	Number	Gross Tonnage
Tanker	23	377,773
Ore Carrier	2	16,154
Dredge	1	21,572
Total	26	415,499

† On Jan. 1, 1951, 29 vessels aggregating 400,833 gross tons were under construction, compared with 40 vessels aggregating 660,572 gross tons on Jan. 1, 1950.

Shipbuilders Council of America

Uncompleted Merchant Vessels

Jan. 1, 1951

	Number	Gross Tonnage
Seatrain Type Cargo	2	16,600
Auto Ferry	1	7,420
Passenger	3	89,000
Bulk Ore Carrier	10	113,925
Tanker	5	89,138
Cargo	1	8,800
Navy Transport	3	40,500
Passenger-Railway Ferry	2	8,600
Self-Unloader Carrier	2	26,850
Total	29	400,833

Shipbuilders Council of America

Naval Shipbuilding

Private Yards' Naval Backlog

Jan. 1, 1951

Type	No.	Displacement Tonnage
Destroyers	5	17,025
Task Fleet Command Ship	1	13,600
Submarines	3	4,710
Anti-Submarine Submarine	1	750
Hunter Killer Ship	1	6,000
Total	11	42,085

There were no new contracts and no deliveries in 1950.

Shipbuilders Council of America

Civil Aircraft

Complete Airplanes Shipped

	Number		Value (Thousands)	
	1951	1950	1951	1950
January	255	167	$ 4,859	$12,103
February	239	225	3,667	7,911
March	273	326	3,350	5,731
April	247	329	13,352	6,390
May	248	377	10,738	7,809
June	216	369	8,090	9,381
July	207	321	6,419	6,583
August	171	354	5,485	7,909
September	184	301	5,525	8,091
October	....	204	....	5,118
November		242		15,072
December		305		7,999

YEARLY TOTALS

	Number	Value
1950	3,520	$100,097,000
1949	3,545	121,446,334
1948	7,302	114,207,590
1947	15,617	176,505,649
1946	34,874	170,799,937

U. S. Bureau of the Census

New Locomotives Placed in Service by Class 1 Railroads

	Diesel	Steam	Electric	Total
1951				
11 Mos.	2,346	17	3	2,366
Jan.	218	1	0	219
Feb.	189	0	0	189
Mar.	210	1	0	211
Apr.	217	2	0	219
May	214	2	1	217
June	251	2	1	254
July	172	2	0	174
Aug.	162	2	0	164
Sept.	207	2	0	209
Oct.	277	2	0	279
Nov.	229	1	1	231
Dec.	...	...	...	...
1950	2,372	12	12	2,396
Jan.	100	1	0	101
Feb.	185	0	0	185
Mar.	197	1	0	198
Apr.	207	1	0	208
May	229	1	0	230
June	204	1	0	205
July	161	1	0	162
Aug.	185	1	3	189
Sept.	213	1	1	215
Oct.	234	1	4	239
Nov.	196	2	2	200
Dec.	261	1	2	264
1949	1,808	57	0	1,865
1948	1,397	86	4	1,487
1947	771	72	2	845
1946	480	83	0	563

Association of American Railroads

Bicycles Shipped

1951*	1,600,000	1946	1,650,000
1950	1,950,000	1942-1945	None
1949	1,600,000	1941	1,830,000
1948	2,750,000	1940	1,300,000
1947	2,750,000	1939	1,220,000

* Estimated

Railroad Passenger Car Shipments

Number of Cars

	1951	1950	1949	1948	1947
Jan.	26	61	91	83	65
Feb.	19	64	80	74	87
Mar.	19	87	76	94	74
Apr.	29	82	85	121	90
May	23	113	95	64	63
June	38	106	98	46	70
July	19	94	69	62	114
Aug.	14	104	70	61	24
Sept.	25	70	94	65	32
Oct.	21	71	90	92	76
Nov.	..	58	85	88	107
Dec.	..	54	80	96	85

MONTHLY AVERAGES

1950	80	1944	84	1939	23
1949	84	1943	59	1938	36
1948	79	1942	36	1937	52
1947	74	1941	30	1936	16
1946	114	1940	24	1935	17
1945	78				

American Railway Car Institute

Freight Car Awards

Number of Cars

	1951	1950	1949	1948	1947
Jan.	26,356	9,376	1,638	8,619	9,222
Feb.	15,947	9,065	332	10,697	13,724
Mar.	11,271	6,201	199	13,227	12,048
Apr.	6,228	3,298	30	17,205	9,186
May	4,919	11,636	589	2,146	7,389
June	6,793	2,095	153	5,368	12,784
July	2,417	30,065	408	10,508	14,840
Aug.	1,828	23,850	185	3,249	2,352
Sept.	9,657	25,111	123	738	9,917
Oct.	3,464	21,886	201	8,330	16,737
Nov.	6,752	10,573	1,145	4,352	8,079
Dec.		3,326	1,220	8,318	4,630
Total		156,482	6,223	92,787	120,308

YEARLY TOTALS

1946	67,193	1945	45,432

American Railway Car Institute

FREIGHT CAR SHIPMENTS

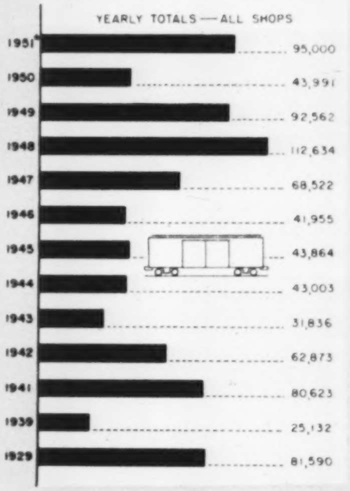
Domestic—Number of Cars

1951	Car-Builders	Rail-road Shops	Total No. Cars
Jan.	4,405	1,544	5,949
Feb.	4,514	1,328	5,842
Mar.	4,966	2,045	7,011
Apr.	5,781	2,493	8,274
May	7,198	2,576	9,774
June	7,185	2,459	9,644
July	4,014	1,276	5,290
Aug.	5,156	2,027	7,183
Sept.	5,755	2,778	8,533
Oct.	6,777	3,305	10,082
Nov.	6,315	3,509	9,824
Dec.	....	....	....
11 Mos.	62,066	25,340	87,406

1950	Car-Builders	Rail-road Shops	Total No. Cars
Jan.	1,006	1,389	2,395
Feb.	917	1,129	2,046
Mar.	830	882	1,712
Apr.	223	748	971
May	1,211	982	2,193
June	3,165	709	3,874
July	2,148	1,326	3,474
Aug.	2,787	2,416	5,203
Sept.	2,395	2,736	5,131
Oct.	2,444	3,057	5,501
Nov.	3,352	2,439	5,791
Dec.	3,965	1,735	5,700
Total	24,443	19,548	43,991

American Railway Car Institute

* Estimated



Appliances

Floor and Wall Furnaces

Factory Shipments

	1951		1950	
	Number of Units	Value, Thousands of Dollars	Number of Units	Value, Thousands of Dollars
Jan	48,628	2,978	33,312	1,782
Feb	53,956	2,973	25,835	1,317
Mar	51,467	3,225	32,201	1,701
Apr	35,156	2,043	36,010	2,007
May	33,020	2,067	41,026	2,203
June	24,726	1,492	50,419	2,739
July	27,564	1,645	67,318	3,636
Aug	36,632	2,393	100,715	5,665
Sept	51,659	3,168	86,614	5,179
Oct			88,205	5,352
Nov			70,224	4,672
Dec			58,208	3,478

YEARLY TOTALS

	Number of Units	Value, Thousands of Dollars
1950	690,087	39,731
1949	448,924	25,132
1948	529,672	28,909

U. S. Bureau of the Census

Oil Burners

Shipments, Burners and Units

	1951		1950	
	Residential	Com'l, Indus'l	Residential	Com'l, Indus'l
Jan	60,649	3,184	35,037	1,613
Feb	55,708	2,842	34,913	1,895
Mar	52,226	3,195	49,684	2,301
Apr	43,963	2,841	44,053	2,155
May	39,163	2,821	61,918	2,083
June	44,252	2,567	78,124	2,438
July	41,745	2,758	95,986	2,670
Aug	60,309	3,269	134,846	3,741
Sept	72,411	3,007	111,804	3,976
Oct			109,508	4,133
Nov			66,725	3,560
Dec			56,018	4,162
Total			879,016	34,727

YEARLY TOTALS

	Residential	Com'l, Indus'l		Residential	Com'l, Indus'l
1949	569,445	24,465	1941	271,673†	32,196
1948	552,625	27,043	1940	247,663†	16,569
1947	1,078,576	48,776	1939	201,735†	13,295
1946	499,060	37,306	1938	129,323†	9,888
1945	139,611	30,750	1937	177,675†	15,505
1944	45,752†	31,329	1936	182,130†	14,747
1943	27,956†	44,602	1935	126,820†	12,079
1942	82,357†	48,674	1934	89,007†	11,595

† Includes water heating units

U. S. Bureau of the Census

Mechanical Stokers

Factory Sales, Number of Units

	1951		1950	
	Small†	Large†	Small†	Large†
Jan	1,439	371	1,181	252
Feb	1,308	366	577	177
Mar	1,434	334	596	212
Apr	1,052	295	730	204
May	822	336	632	245
June	1,119	442	1,233	443
July	1,175	398	1,989	493
Aug	2,452	573	3,956	826
Sept	2,588	580	3,106	798
Oct	2,828	618	2,562	647
Nov			1,589	476
Dec			1,484	629

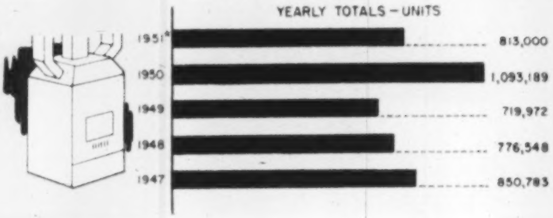
YEARLY TOTALS

	Small†	Large†		Small†	Large†
1950	19,635	5,402	1944	31,603	11,355
1949	29,311	5,949	1943	17,785	15,074
1948	77,220	8,938	1942	79,062	8,938
1947	61,596	7,312	1941	182,956	9,491
1946	181,223	9,695	1940	144,758	8,067
1945	119,079	11,745	1939	96,245	8,044

† Small consists of classes 1 and 2 as defined by U. S. Bureau of the Census and large consists of classes 3, 4 and 5

WARM AIR FURNACES

(Cast Iron and Steel)



Shipments

	1951		1950	
	Number of Units	Value, Thousands of Dollars	Number of Units	Value, Thousands of Dollars
Jan.	71,143	14,460	39,887	7,376
Feb.	71,966	14,732	45,618	7,973
Mar.	79,239	15,978	59,982	10,739
Apr	60,337	11,921	58,798	10,585
May	56,282	11,463	78,349	13,813
June	61,910	12,840	98,517	17,688
July	55,045	11,657	102,189	18,553
Aug	77,192	16,177	145,512	27,033
Sept.	87,412	18,677	139,014	26,216
Oct			137,915	27,243
Nov			102,001	19,933
Dec			85,407	17,070

Yearly Totals	Number of units	Value, in dollars
1950	1,093,189	204,222,000
1949	719,972	130,548,000
1948	776,548	136,936,932
1947	850,783	141,943,102
1946	699,058	88,016,228
1945	372,974	37,938,586
1944	281,160	not available

U. S. Bureau of the Census

* Estimated

Forced Air Furnaces

Shipments, Number of Units

	Solid Fuel	Oil	Gas	Total
1951				
9 Mos	20,491	214,646	232,351	467,488
Jan	1,580	25,684	28,921	56,185
Feb	1,942	24,166	29,404	55,512
Mar	2,585	23,626	32,585	58,796
Apr.	2,413	18,641	24,162	45,216
May	2,062	18,130	22,254	42,446
June	2,158	20,466	22,943	45,567
July	1,821	20,747	19,829	42,397
Aug	3,043	28,210	24,866	56,119
Sept	2,887	34,976	27,387	65,250
Oct				
Nov				
Dec				
1950	29,430	340,189	462,143	831,762
Jan	960	12,960	14,641	28,561
Feb	957	13,444	17,783	32,184
Mar	933	17,451	26,313	44,697
Apr	962	14,598	27,823	43,383
May	1,967	20,112	35,453	57,532
June	2,231	29,459	42,746	74,436
July	3,606	32,801	42,968	79,375
Aug	5,566	43,073	60,919	109,558
Sept	4,149	42,973	58,976	106,098
Oct	3,539	49,113	55,095	107,747
Nov	2,599	35,629	41,287	79,515
Dec	1,961	28,576	38,139	68,676
1949	32,827	204,256	212,123	449,206
1948	77,958	179,479	143,536	400,973
1947	31,404	290,114	142,319	463,837
1946	17,631	72,977	152,595	243,203

U. S. Bureau of the Census

Gravity Air-Flow Furnaces

Shipments—Number of Units

	Solid Fuel	Oil	Gas	Total
1951				
9 Mos.	87,877	12,194	52,967	153,038
Jan.	6,526	955	7,477	14,958
Feb.	9,098	791	6,565	16,454
Mar.	10,890	958	8,595	20,443
Apr.	8,275	975	5,871	15,121
May	8,096	1,097	4,643	13,836
June	9,406	1,648	5,289	16,343
July	7,941	1,036	3,671	12,648
Aug.	13,739	2,420	4,914	21,073
Sept.	13,906	2,314	5,942	22,162
Oct.				
Nov.				
Dec.				
1950	108,937	17,915	134,575	261,427
Jan.	4,878	736	5,712	11,326
Feb.	5,831	804	6,799	13,434
Mar	4,397	897	9,991	15,285
Apr.	3,475	867	11,073	15,415
May	4,934	1,174	14,709	20,817
June	6,943	1,408	15,730	24,081
July	9,000	2,579	11,235	22,814
Aug.	17,839	2,571	15,544	35,954
Sept	15,644	2,007	15,265	32,916
Oct.	16,055	2,172	11,941	30,168
Nov.	12,078	1,359	9,049	22,486
Dec.	7,863	1,341	7,527	16,731
1949	168,981	15,048	86,737	270,766
1948	319,958	10,997	44,620	375,575
1947	315,994	25,426	45,526	386,946
1946	378,265	7,083	70,507	455,855

U. S. Bureau of the Census

Cast Iron Boilers, Radiators and Convectors

Shipments

Boilers

	Thousands of Pounds		Value, Thousands of Dollars	
	1951	1950	1951	1950
Jan	21,262	10,595	4,706	2,235
Feb	19,458	10,534	4,382	2,147
Mar	19,456	11,144	4,361	2,273
Apr	12,898	12,573	2,933	2,578
May	10,443	15,349	2,418	3,081
June	12,770	19,386	2,985	3,923
July	11,461	25,747	2,708	5,124
Aug	18,748	40,329	4,229	8,175
Sept	21,704	40,153	4,970	8,218
Oct		38,488		7,887
Nov		25,754		5,268
Dec		17,399		3,653

YEARLY TOTALS

	Thousands of Pounds	Value, Thousands of Dollars
1950	267,451	54,562
1949	206,296	40,525
1948	263,303	43,756
1947	326,129	48,273
1946	249,765	28,689

Radiation†

	Thousands of sq ft		Value, Thousands of Dollars	
	1951	1950	1951	1950
Jan	4,675	2,678	2,805	1,428
Feb	4,311	2,966	2,609	1,547
Mar	4,658	3,015	2,867	1,571
Apr	3,550	2,440	2,219	1,313
May	2,413	2,025	1,537	1,073
June	2,284	3,513	1,174	1,802
July	2,220	4,020	1,306	2,205
Aug	3,564	6,449	2,190	3,506
Sept	4,056	5,714	2,512	3,121
Oct		5,798		3,251
Nov		5,127		2,917
Dec		4,372		2,545

YEARLY TOTALS

	Thousands of sq ft	Value, Thousands of Dollars
1950	48,117	26,279
1949	35,888	19,936
1948	60,333	31,426
1947	56,720	24,356
1946	38,358	14,787

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† Includes radiators and convectors

U. S. Bureau of the Census

Domestic Heating Stoves

Shipments—1951

	Coal, Wood	Gas	Oil	Total
Jan	44,719	112,939	77,922	235,580
Feb	50,814	128,797	90,818	270,429
Mar	62,291	159,485	89,657	311,433
Apr	55,400	164,258	65,526	285,184
May	66,439	131,847	88,592	286,878
June	69,997	141,063	75,473	286,533
July	77,824	158,146	114,521	350,491
Aug	130,600	168,005	153,366	451,971
Sept	136,644	175,857	140,470	452,971
Oct				

YEARLY TOTALS

	Coal, Wood	Gas	Oil	Total
1950	887,701	1,993,317	1,311,726	4,192,744
1949	955,571	1,441,335	1,265,865	3,662,771
1948	1,203,606	2,083,990	1,939,693	5,227,289
1947	1,305,648	2,619,895	2,412,216	6,337,759

U. S. Bureau of the Census

Coal and Wood Cooking Stoves

Shipments—Units

	1951	1950	1949	1948
Jan	12,136	10,581	14,307	29,955
Feb	10,939	11,933	15,890	32,169
Mar	12,714	14,527	17,130	31,633
Apr	8,447	12,170	12,555	23,589
May	7,911	8,663	10,693	19,724
June	9,201	8,783	10,376	20,068
July	6,313	11,113	11,707	20,131
Aug	10,028	21,045	17,186	27,607
Sept	11,741	16,157	19,060	27,803
Oct		14,827	16,720	25,480
Nov		11,187	15,000	20,832
Dec		9,990	9,304	16,536

YEARLY TOTALS

1950	150,976	1948	295,527	1946	405,107
1949	169,928	1947	449,356	1945	358,899

U. S. Bureau of the Census

Gas Water Heaters

Shipments—Underfired and Sidearm Types

	1951		1950	
	Units	Value, Thousands of Dollars	Units	Value, Thousands of Dollars
Jan	242,508	11,411	149,759	6,193
Feb	228,214	11,165	168,260	6,888
Mar	237,991	12,173	189,569	8,089
Apr	213,491	10,649	191,547	8,384
May	179,971	9,288	211,233	9,301
June	142,741	7,374	225,595	9,717
July	110,887	5,828	214,858	9,203
Aug	134,128	6,601	280,205	12,[illegible]76
Sept	13[illegible],432	6,339	240,047	10,261
Oct			251,528	11,015
Nov			220,894	10,005
Dec			217,694	10,107

YEARLY TOTALS

	Units	Value
1950	2,561,189	$111,339,000
1949	1,656,385	74,106,000
1948	1,730,331	77,034,830
1947	2,056,536	86,377,903

U. S. Bureau of the Census

Plumbing Fixtures

Shipments—Value in Thousands of Dollars

VITREOUS CHINA AND GLAZED EARTHENWARE

Qtr.	1951	1950	1949	1948
1st	$30,997	$20,992	$20,319	$17,976
2nd	30,298	23,513	17,547	19,398
3rd	25,982	28,007	18,470	21,459
4th		28,980	20,821	25,168
Total		$101,492	$77,157	$84,001

METAL—EXCLUSIVE OF FITTINGS

Qtr.	1951	1950	1949	1948
1st	$64,383	$41,682	$27,919	$41,086
2nd	57,039	48,137	28,787	40,850
3rd	40,599	55,439	39,255	41,189
4th		62,521	43,267	48,038
Total		$207,779	$139,228	$171,163

YEARLY TOTALS

VITREOUS CHINA AND GLAZED EARTHENWARE

1947	$60,754	1946	$47,711

METAL—EXCLUSIVE OF FITTINGS

1947	$126,205	1946	$72,472

U. S. Bureau of the Census

Oil Cooking Stoves

(Kerosene, Gasoline and Fuel Oil)

Shipments—Units

	1951	1950	1949	1948
Jan	16,445	14,305	14,733	47,383
Feb	15,311	15,739	19,774	56,481
Mar	14,752	18,663	20,064	68,944
Apr	9,248	11,862	14,615	55,157
May	8,720	13,904	14,113	44,878
June	9,449	16,564	13,702	39,899
July	8,430	14,682	11,000	34,955
Aug	8,425	22,153	17,312	28,644
Sept	9,720	18,670	14,023	26,416
Oct		13,952	16,806	19,978
Nov		13,544	15,824	21,646
Dec		16,738	13,973	22,396

YEARLY TOTALS

1950	190,776	1948	466,777	1946	516,308
1949	185,939	1947	559,579	1945	513,670

U. S. Bureau of the Census

Electric Lamps (Bulbs)

Manufacturers' Shipments
Value in Thousands of Dollars

	Domestic	Export	Total
1950	$233,860	$9,297	$243,157
1949	192,638	7,240	199,878
1948	199,291	8,879	208,170
1947	183,789	10,600	194,389
1946	136,281	7,584	143,865
1945	136,725	7,423	144,148
1944	n.a.	n.a.	137,166
1943	n.a.	n.a.	126,548

PRODUCTION

Thousands of Lamps

1950	2,084,607	1948	1,976,674
1949	1,832,423	1947	1,881,395

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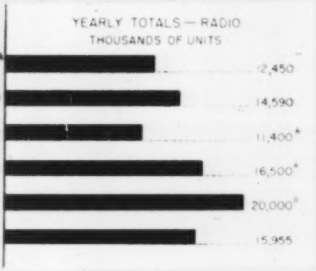
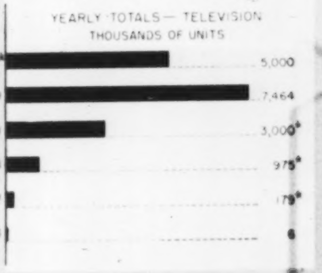
n.a. = Not available.

U. S. Bureau of the Census

RADIO AND TELEVISION RECEIVERS





Number Produced

	Radios			Tele-visi
	Home	Auto	Portable	
1951				
10 Mos.	5,646,642	4,114,736	1,190,823	4,382,[illegible]
Jan.	750,289	346,799	75,294	645,[illegible]
Feb.	764,679	437,779	79,859	679,[illegible]
Mar.	988,078	545,297	147,037	874,[illegible]
Apr.	619,651	542,021	150,494	469,[illegible]
May	581,557	603,534	164,171	339,[illegible]
June	346,135	494,202	228,454	326,[illegible]
July	184,002	293,955	70,538	152,[illegible]
Aug.	295,587	190,252	77,588	146,[illegible]
Sept.	603,065	393,836	103,355	337,[illegible]
Oct.	513,609	287,061	94,053	411,[illegible]
Nov.	......	......	......	[illegible]
Dec.	......	......	......	[illegible]

Radios

YEARLY TOTALS

	Units	Value (Manufactur
1950	14,589,900	$359,600,[illegible]*
1949	11,400,000*	310,000,[illegible]*
1948	16,500,000*	525,000,[illegible]*
1947	20,000,000*	650,000,000*
1946	15,955,000	434,244,000
1942†	4,306,984	102,968,700
1941	13,642,334	233,841,100
1940	11,831,187	176,626,900
1939	10,762,631	153,421,100
1938	7,141,811	112,263,000
1937	8,083,144	165,390,900
1936	8,248,755	169,359,700
1935	6,030,508	128,399,100
1934	4,478,967	94,859,400
1933	4,157,045	70,269,400
1932	2,446,143	54,374,700
1931	3,593,993	104,705,400
1930	3,788,961	155,432,300

Television

YEARLY TOTALS

	Units	Value (Manufacturers')
1950	7,463,800	$1,335,000,000
1949	3,000,000*	580,000,000
1948	975,000*	230,000,000
1947	178,571	50,000,000
1946	6,476	1,250,000

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*Estimated.

†Civilian production was curtailed from April, 1942, to December, 1945.

Radio-Television Manufacturers Association

Appliances

Electric Disc Stoves and Hot Plates

(1650 Watts or Less)

Sales Billed—Units

	1951	1950	1949
January	35,776	27,009	12,730
February	40,188	30,707	20,272
March	60,294	45,609	26,934
April	56,734	35,712	19,046
May	25,304	31,283	23,057
June	18,080	38,665	25,627
July	12,862	23,379	22,677
August	24,366	60,695	35,610
September	19,754	57,768	37,332
October	[illegible]	43,660	49,783
November		36,796	37,663
December		50,273	23,696
Total		481,556	334,427

National Electrical Manufacturers Association

Electric Air Heaters, Portable

Sales Billed—Units

CONVECTOR AND RADIANT

	1951	1950	1949
January	11,274	5,940	14,935
February	15,825	5,642	7,377
March	17,292	6,744	2,924
April	7,872	860	2,066
May	5,364	1,523	2,306
June	8,018	7,554	7,871
July	5,469	13,400	30,862
August	7,143	40,300	44,922
September	17,233	42,083	129,706
October	31,360	65,104	106,605
November		26,858	69,333
December		15,612	18,143
Total		229,620	437,050

FAN FORCED AND FAN AND HEATER COMBINATION

	1951	1950
January	36,626	6,556
February	37,628	4,628
March	20,856	8,099
April	8,526	4,002
May	3,051	3,093
June	3,046	17,066
July	14,654	32,423
August	35,015	73,692
September	44,070	73,324
October	[illegible]	[illegible]
November		42,243
December		42,395
Total		[illegible]

National Electrical Manufacturers Association

Standard-Size Ironers

Factory Sales—Units

	1951	1950	1949	1948
Jan	24,600	20,300	28,300	40,192
Feb	32,400	27,600	28,400	51,651
Mar	34,700	37,800	23,800	53,686
Apr	23,700	31,600	18,100	47,319
May	24,200	27,400	19,500	44,954
June	24,500	27,100	21,100	32,767
July	11,100	25,100	17,700	26,679
Aug	17,200	42,700	32,300	35,203
Sept	18,300	41,400	27,700	37,308
Oct	29,800	47,500	36,045	38,517
Nov		41,900	35,000	42,000
Dec		38,800	19,400	26,000

YEARLY TOTALS

1950	409,200	1945–43*	None
1949	307,345	1942*	66,060
1948	476,276	1941	259,668
1947	599,258	1940	175,466
1946	124,616	1939	127,093

* Civilian production stopped from mid-1942 through 1945.

American Home Laundry Manufacturers' Association

Electric Grills and Waffle Irons

Sales Billed—Units

Sandwich Grills & Griddles & Combination Grills & Waffle Irons

	1951	1950
January	93,409	53,725
February	110,702	70,402
March	132,221	85,181
April	98,463	70,406
May	48,964	75,736
June	37,505	82,551
July	42,186	78,082
August	48,767	182,917
September	100,009	186,528
October	107,384	142,250
November		128,579
December		153,976
Total		1,310,333

WAFFLE IRONS

	1951	1950
January	25,589	18,257
February	28,136	21,653
March	28,782	15,187
April	31,805	12,944
May	21,287	20,113
June	10,697	23,697
July	7,198	12,212
August	18,915	65,522
September	17,703	82,661
October	23,275	64,946
November		59,389
December		42,091
Total		438,672

National Electrical Manufacturers Association

Electric Freezers

(Home and Farm)

Sales Billed—Units

	1951	1950	1949
January	71,708	31,948	27,230
February	63,996	39,193	24,215
March	77,937	51,970	27,204
April	64,336	42,480	21,441
May	56,623	36,940	20,139
June	63,322	52,825	27,735
July	56,815	76,699	30,988
August	68,587	76,753	35,384
September	67,968	62,019	31,194
October	60,451	63,455	20,502
November		49,851	23,763
December		61,018	24,162
Total		645,151	313,957

National Electrical Manufacturers Association

Electric Coffee Makers, Pots & Urns

Vacuum (glass & metal) and Percolators
Sales Billed—Units

	1951	1950	1949
January	74,886	59,096	28,626
February	119,689	53,961	32,556
March	147,935	80,977	50,156
April	82,672	80,979	46,077
May	60,013	69,877	38,035
June	109,168	88,608	35,750
July	48,025	63,013	21,026
August	85,702	128,605	31,104
September	82,193	171,117	59,478
October	84,603	150,799	80,171
November		137,806	85,376
December		111,800	75,637
Total		1,196,638	583,992

National Electrical Manufacturers Association

Electric Toasters

Sales Billed—Units

AUTOMATIC

	1951	1950	1949
January	292,423	244,345	281,509
February	319,129	264,111	303,584
March	364,745	226,774	342,312
April	263,153	192,567	190,194
May	209,649	209,337	168,979
June	157,077	151,330	149,590
July	95,940	245,111	137,273
August	183,874	440,078	225,590
September	219,698	479,726	301,301
October	[illegible]	358,169	331,029
November		372,356	348,649
December		335,054	371,943
Total		3,518,958	3,151,953

NONAUTOMATIC

	1951	1950	1949
January	8,641	12,407	9,725
February	10,888	11,282	20,826
March	7,265	10,350	11,504
April	3,867	5,892	8,732
May	5,260	4,942	7,019
June	3,719	5,629	3,646
July	3,099	8,720	4,927
August	9,440	35,791	12,355
September	12,823	26,751	17,424
October	11,527	33,333	34,509
November		18,174	24,266
December		22,901	21,804
Total		196,172	176,737

National Electrical Manufacturers Association

Electric Roasters

Sales Billed—Units

	1951	1950	1949
January	33,885	25,698	29,999
February	51,119	36,507	40,587
March	55,148	23,204	21,849
April	35,875	20,224	11,371
May	27,360	19,300	10,123
June	21,013	25,741	15,022
July	15,015	36,972	11,480
August	40,494	41,792	20,918
September	34,138	38,785	41,285
October	39,572	39,271	43,540
November		48,084	44,255
December		38,096	36,960
Total		393,674	327,389

National Electrical Manufacturers Association

Electric Broilers

Sales Billed—Units

	1951	1950	1949
January	7,245	4,438	7,011
February	8,082	3,320	5,792
March	6,981	4,097	4,650
April	6,088	4,178	3,275
May	2,253	3,129	2,619
June	5,735	4,364	2,617
July	1,727	5,374	1,559
August	3,560	10,128	1,843
September	5,809	12,756	2,097
October	7,494	8,342	7,433
November		10,661	5,919
December		6,962	3,633
Total		77,749	48,448

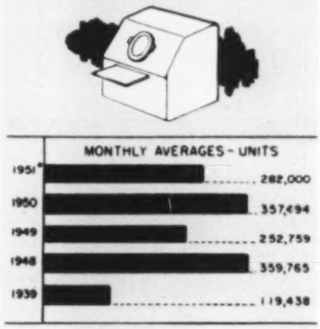
National Electrical Manufacturers Association

Steel Kitchen Cabinets

(Factory Sales)

	Units	Retail Value
1951*	2,871,000	$128,850,500
1950	2,969,000	125,848,500
1949	2,658,000	105,000,000
1948	3,500,000	138,000,000
1947	2,790,000	104,000,000

Steel Kitchen Cabinet Manufacturers Assn. Inc.



WASHERS

Sales Billed—Units

	1951	1950	1949
Jan.	321,092	275,576	172,400
Feb.	341,328	342,967	201,300
Mar.	368,455	423,802	242,500
Apr.	292,193	333,072	192,500
May	253,942	304,640	211,700
June	253,119	325,217	260,700
July	139,799	282,261	200,900
Aug.	239,081	381,452	323,789
Sept.	313,756	424,043	357,281
Oct.	297,210	439,924	333,728
Nov.	......	379,964	298,717
Dec.	......	377,013	237,591

YEARLY TOTALS

1950....	4,289,931	1947....	3,783,632
1949....	3,033,106	1946....	2,023,981
1948....	4,317,183	1945-43† ...	None

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† Civilian production curtailed from July, 1942, to December, 1945.

American Home Laundry Manufacturers' Association

Automatic Tumbler Dryers

Factory Sales—Units

	1951	1950	1949
January	31,935	19,495	9,437
February	36,851	19,389	9,407
March	44,020	27,125	8,429
April	32,960	25,140	4,458
May	32,292	16,122	3,910
June	39,908	20,568	2,496
July	26,268	23,588	2,775
August	40,191	32,318	5,526
September	43,752	31,399	10,806
October	59,299	28,882	15,760
November	......	33,044	17,441
December	......	41,418	15,282
Total	......	318,488	105,727

American Home Laundry Manufacturers' Association

Household Electric Ranges

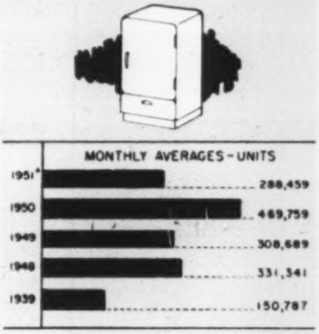
Domestic Sales—Units

	1951	1950	1949
Jan.	130,316	97,139	106,473
Feb	121,585	118,059	87,370
Mar	159,865	144,123	87,543
Apr.	118,823	131,182	59,894
May	106,685	144,093	52,286
June	106,589	156,571	68,107
July	60,530	129,072	62,402
Aug.	64,042	130,651	66,222
Sept.	93,551	152,852	91,073
Oct.	109,043	128,367	72,672
Nov.		126,303	59,325
Dec.		122,201	74,586

YEARLY TOTALS

1950......	1,580,613	1944......	42,712
1949......	887,953	1943......	8,480
1948......	1,341,497	1942......	161,312
1947......	1,016,536	1941......	683,859
1946......	542,168	1940......	404,239
1945......	146,046	1939......	296,846

National Electrical Manufacturers Association



ELECTRIC REFRIGERATORS

Domestic Sales—Units

	1951	1950	1949
Jan.	465,903	364,002	380,853
Feb.	403,035	450,751	337,424
Mar.	558,503	572,691	369,216
Apr.	409,887	531,498	324,370
May	309,722	528,506	330,753
June	261,298	534,489	296,199
July	163,922	490,802	315,444
Aug.	165,309	496,486	307,622
Sept.	193,929	512,125	309,429
Oct.	191,519	399,330	252,580
Nov.	......	386,142	221,221
Dec.	......	370,286	259,158

YEARLY TOTALS

1950....	5,637,108	1944....	40,034
1949....	3,704,269	1943....	156,697
1948....	3,976,091	1942....	378,725
1947....	2,994,297	1941....	3,303,572
1946....	1,811,326	1940....	2,528,566
1945....	267,061	1939....	1,809,445

National Electrical Manufacturers Assn.

* Estimated.

Standard Vacuum Cleaners

Sales Billed—Units

	1951	1950	1949
Jan.	282,305	249,150	228,769
Feb.	261,572	263,515	241,574
Mar.	290,242	361,014	309,897
Apr.	227,216	292,664	252,656
May	201,983	278,645	222,850
June	194,548	250,190	207,354
July	161,002	279,967	161,920
Aug.	191,299	341,232	219,909
Sept.	210,086	327,524	250,036
Oct.	259,469	331,445	272,520
Nov		265,310	253,516
Dec.		288,756	265,513

YEARLY TOTALS

1950......	3,529,412	1947......	3,800,687
1949......	2,886,514	1946......	2,289,441
1948......	3,368,108	1945-43†..	None

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† Civilian production curtailed from January, 1943, to December, 1945.

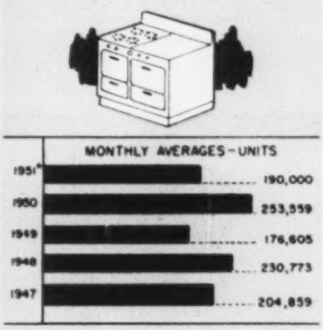
Vacuum Cleaner Manufacturers Association

Electric Food Mixers

Sales Billed—Units

	1951	1950
January	27,957	18,126
February	32,409	29,716
March	39,132	44,532
April	48,637	26,969
May	35,953	27,251
June	30,334	35,159
July	20,610	31,720
August	22,903	65,520
September	40,646	75,375
October	43,957	54,996
November	......	49,365
December	......	51,375
Totals	......	510,104

National Electrical Manufacturers Association



HOUSEHOLD GAS RANGES†

Shipments—Units

	1951	1950	1949
Jan.	261,793	167,221	108,829
Feb.	255,112	209,156	119,251
Mar.	290,989	265,829	155,721
Apr.	225,879	239,706	155,170
May	178,490	244,080	155,588
June	129,107	220,936	164,016
July	116,952	256,075	126,630
Aug.	169,224	333,439	210,976
Sept.	184,815	288,809	232,005
Oct.	......	309,846	263,563
Nov.	......	270,613	246,398
Dec.	......	237,001	181,113

YEARLY TOTALS

1950....	3,042,711	1947....	2,456,305
1949....	2,119,260	1946....	1,877,780
1948....	2,769,278	1945....	1,018,462

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† Including bungalow and combination.

U. S. Bureau of the Census

Electric Flat Irons

Sales Billed—Units

	1951	1950	1949
January	379,810	201,523	185,950
February	536,684	410,041	460,364
March	635,350	509,606	362,593
April	645,571	339,091	164,458
May	561,284	446,173	231,858
June	571,741	437,697	232,661
July	293,867	423,170	328,316
August	400,494	564,887	462,224
September	645,620	686,114	432,826
October	387,323	522,765	385,278
November	......	577,586	436,575
December	......	747,922	252,082
Total	......	5,866,575	3,935,185

National Electrical Manufacturers Association

Electric Water Heaters

Domestic Unit Sales of Storage Tank Type

	1951	1950	1949
January	73,067	43,842	31,576
February	58,720	52,249	39,683
March	82,830	63,932	49,529
April	69,524	61,950	38,248
May	67,805	65,645	43,782
June	55,769	75,509	48,759
July	43,285	63,463	40,118
August	42,970	74,380	45,778
September	40,432	79,383	50,790
October	51,533	76,087	50,383
November	...	71,685	39,242
December	......	70,562	39,926

YEARLY TOTALS

1950......	798,687	1944......	31,527
1949......	508,814	1943......	24,720
1948......	706,389	1942......	80,986
1947......	817,717	1941......	177,042
1946......	399,826	1940......	98,005
1945......	129,722	1939......	80,777

National Electrical Manufacturers Association

Business Indexes

METALWORKING FACTS AND FIGURES

INDEXES OF INDUSTRIAL PRODUCTION

FEDERAL RESERVE BOARD—1935-1939=100

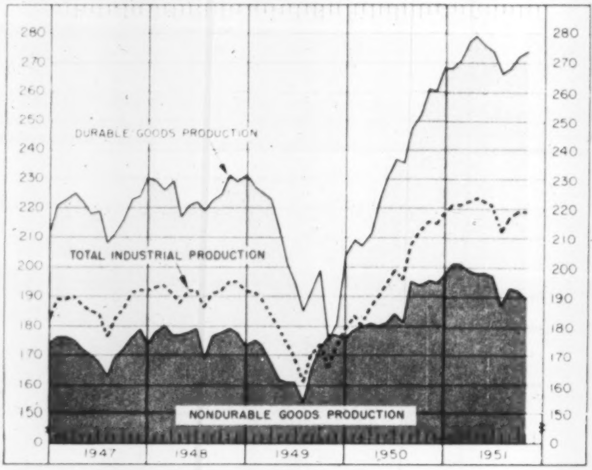
Total Industrial Production

Adjusted for Seasonal Variation

	1951	1950	1949	1948	1947
Jan	221	183	191	193	189
Feb	221	180	189	194	189
Mar	222	187	184	191	190
Apr	223	190	179	188	187
May	222	195	174	192	185
June	221	199	169	192	184
July	212	196	161	186	176
Aug	217	209	170	191	182
Sept	219	211	174	192	186
Oct	219	216	166	195	191
Nov		215	173	195	192
Dec		218	179	192	192

YEARLY INDEXES—UNADJUSTED

1951*	219	1946	170	1942	199
1950	200	1945	203	1941	162
1949	176	1944	235	1940	125
1948	192	1943	239	1939	109
1947	187				



Iron and Steel

Adjusted for Seasonal Variation

	1951	1950	1949	1948	1947
Jan	255	203	228	203	193
Feb	252	201	232	203	192
Mar	263	205	233	207	197
Apr	264	222	219	177	196
May	263	226	204	208	198
June	261	231	177	208	194
July	253	228	156	201	182
Aug	254	236	178	207	189
Sept	258	245	179	214	190
Oct	261	253	102	221	205
Nov		246	145	224	203
Dec		253	201	223	206

Nonferrous Metals and Products Output

Adjusted for Seasonal Variation

	1951	1950	1949	1948	1947
Jan	224	180	183	195	203
Feb	217	190	185	199	208
Mar	209	201	183	201	202
Apr	211	198	167	200	197
May	206	197	145	196	187
June	205	206	133	193	179
July	199	202	127	185	171
Aug	197	212	141	186	170
Sept	199	216	157	192	174
Oct	207	223	164	192	179
Nov		226	163	188	185
Dec.		227	167	184	189

Durable Goods

Adjusted for Seasonal Variation

	1951	1950	1949	1948	1947
Jan	268	209	227	229	221
Feb	271	207	225	226	223
Mar	277	211	223	229	225
Apr	279	222	212	217	222
May	276	231	201	221	218
June	274	237	194	222	219
July	266	235	185	219	208
Aug	268	247	193	223	211
Sept	272	251	199	225	216
Oct	274	261	175	231	223
Nov		260	181	229	224
Dec		268	203	231	230

Nondurable Goods

Adjusted for Seasonal Variation

	1951	1950	1949	1948	1947
Jan	201	179	175	178	176
Feb	201	180	173	180	176
Mar	199	181	168	177	175
Apr	198	180	162	177	172
May	198	181	161	178	170
June	197	184	161	179	168
July	187	181	154	169	163
Aug	193	195	165	177	169
Sept	192	194	172	178	172
Oct	189	196	177	179	176
Nov	...	195	177	178	179
Dec	...	197	176	173	173

Consumers' Price Index

Cost of Living. 1935-1939=100

	1951	1950	1949	1948
January	181.5	168.2	171.7	169.3
February	183.8	167.9	169.9	168.0
March	184.5	168.4	170.4	167.5
April	184.6	168.5	170.7	169.9
May	185.4	169.3	170.2	171.1
June	185.2	170.2	170.6	172.4
July	185.5	172.0	169.6	174.4
August	185.5	173.4	169.9	175.2
September	186.6	174.6	170.7	175.2
October	187.4	175.6	169.7	174.4
November	188.6	176.4	169.8	173.0
December	...	178.8	168.8	172.2

MONTHLY AVERAGES

1951*	185.6	1944	125.7
1950	171.9	1943	123.7
1949	170.2	1942	116.6
1948	171.9	1941	105.2
1947	159.6	1940	100.2
1946	139.5	1939	99.4
1945	128.4		

U. S. Bureau of Labor Statistics

Wholesale Price Indexes

(1926=100)

ALL COMMODITIES

	1951	1950	1949	1948
Jan.	180.1	151.4	160.7	165.9
Feb.	183.6	152.8	158.4	161.0
Mar.	184.0	152.7	158.6	161.6
Apr.	183.6	152.8	157.1	163.0
May	182.9	155.9	155.8	164.2
June	181.7	157.3	154.5	166.4
July	179.4	162.9	153.6	168.8
Aug.	178.0	166.4	152.9	169.8
Sept.	177.6	169.5	153.5	168.9
Oct.	178.2	169.1	152.2	165.4
Nov.	178.5	171.7	151.6	164.0
Dec.	....	175.3	151.2	162.4

MONTHLY AVERAGES

1951*	180.3	1944	104.0
1950	161.5	1943	103.1
1949	155.0	1942	98.8
1948	165.1	1941	87.3
1947	152.1	1940	78.6
1946	121.1	1939	77.1
1945	105.8		

U. S. Bureau of Labor Statistics

MANUFACTURED PRODUCTS

	1951	1950	1949	1948
Jan.	173.1	148.1	156.1	158.0
Feb.	175.5	149.1	154.3	154.7
Mar.	175.8	148.8	154.4	156.0
Apr.	176.1	149.3	153.1	157.7
May	176.2	152.1	151.6	158.6
June	175.5	153.5	150.6	159.7
July	175.1	158.0	149.8	162.7
Aug.	174.4	161.2	149.4	164.6
Sept.	174.2	164.0	150.1	164.0
Oct.	174.3	163.5	149.1	160.3
Nov.	....	165.1	148.2	158.8
Dec.	....	169.0	147.9	157.6

MONTHLY AVERAGES

1951*	174.9	1944	100.8
1950	156.8	1943	100.1
1949	151.2	1942	98.6
1948	159.4	1941	89.1
1947	146.0	1940	81.6
1946	116.1	1939	80.4
1945	101.8		

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* Estimated

Labor

METALWORKING WAGES & HOURS (Production Workers)

(Average Hourly Wages and Average Weekly Hours)

	PRIMARY METALS		FABRICATED METAL PRODUCTS		MACHINERY Except Electrical		ELECTRICAL MACHINERY		TRANSPORTATION EQUIPMENT		INSTRUMENTS Related Products	
	Wages	Hours	Wages	Hours	Wages	Hours	Wages	Hours	Wages	Hours	Wages	Hours
1951												
Jan.	$1.789	41.6	$1.622	41.8	$1.716	43.4	$1.556	41.4	$1.806	39.9	$1.574	41.8
Feb.	1.779	41.1	1.635	41.7	1.726	43.5	1.569	41.3	1.815	40.8	1.589	42.2
Mar.	1.797	41.8	1.652	42.1	1.745	43.8	1.582	41.3	1.838	41.2	1.599	42.3
Apr.	1.758	42.1	1.655	42.0	1.749	43.9	1.588	41.3	1.829	40.9	1.613	42.5
May	1.799	41.7	1.655	41.8	1.750	43.6	1.604	41.5	1.833	40.9	1.626	42.3
June	1.819	41.8	1.661	41.8	1.762	43.5	1.618	41.5	1.860	40.4	1.630	42.6
July	1.819	41.1	1.658	41.0	1.754	43.0	1.637	40.4	1.863	39.9	1.631	41.8
Aug.	1.806	41.3	1.655	41.4	1.764	43.1	1.628	40.9	1.871	40.8	1.635	42.0
Sept.	1.834	41.2	1.673	41.9	1.785	43.3	1.643	41.6	1.884	41.2	1.654	42.4
Oct.	1.809	41.3	1.681	41.9	1.796	43.1	1.656	41.7	1.885	40.8	1.658	42.4
Nov.	....	...	....	...	....	...	....	...	....	...	....	...
1950 (Av.)	1.648	40.8	1.532	41.4	1.608	41.8	1.480	41.1	1.736	41.0	1.476	41.2
1949 (Av.)	1.587	38.3	1.460	39.6	1.530	39.5	1.442	39.5	1.657	39.2	1.396	39.6

U. S. Department of Labor

Steel Common Labor Rates

	Hourly wage (cents)	Per cent over 1915
1915	20.0	....
February 1, 1916	22.0	10.0
May 1, 1916	25.0	25.0
December 15, 1916	27.5	37.5
May 1, 1917	30.0	50.0
October 1, 1917	33.0	65.0
April 16, 1918	38.0	90.0
August 1, 1918	42.0	110.0
October 1, 1918	46.2	131.0
February 1, 1920	50.6	153.0
May 16, 1921	40.5	102.5
July 16, 1921	37.0	85.0
August 29, 1921	30.0	50.0
September 1, 1922	36.0	80.0
April 16, 1923	40.0	100.0
August, 1923	44.0	120.0
October 1, 1931	39.6	98.0
May 16, 1932	33.7	68.5
August 19, 1933 (NRA)	40.0	100.0
April 1, 1934	44.0	120.0
November, 1936	52.5	162.0
March, 1937	62.5	212.5
April, 1941	72.5	262.5
July, 1942	78.0	290.0
February, 1946	96.5	392.5
April, 1947	109.0	445.0
July 16, 1948	118.5	492.5
December 1, 1950	131.0	555.0

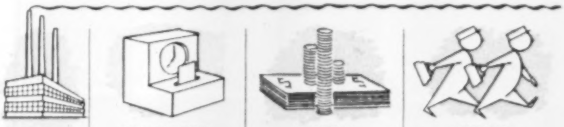
Compiled by STEEL.

Work Stoppages

	Number of Stoppages in Effect	Workers Involved	Man-Days Lost
1951			
10 Mos.	4,065	2,020,000	20,050,000
Jan.	550	215,000	1,200,000
Feb.	550	300,000	1,700,000
Mar.	550	280,000	2,300,000
Apr.	550	235,000	1,850,000
May	580	250,000	1,750,000
June	560	260,000	1,600,000
July	600	320,000	1,750,000
Aug.	625	350,000	2,750,000
Sept.	600	340,000	2,400,000
Oct.	640	360,000	2,750,000
1950	4,843	2,410,000	38,800,000
1949	3,606	3,030,000	50,500,000
1948	3,419	1,960,000	34,100,000
1947	3,693	2,170,000	34,600,000
1946	4,985	4,600,000	116,000,000
1935-39 Av.	2,862	1,130,000	16,900,000

U. S. Department of Labor

METALWORKING PRODUCTION WORKERS



	HOURS PER WEEK (average)	HOURLY EARNINGS (average)	ANNUAL EMPLOYMENT (average)
1951*	41.8 HOURS	$1.751	5,364,000
1950	41.2 HOURS	$1.609	4,695,000
1949	39.2 HOURS	$1.543	4,358,000

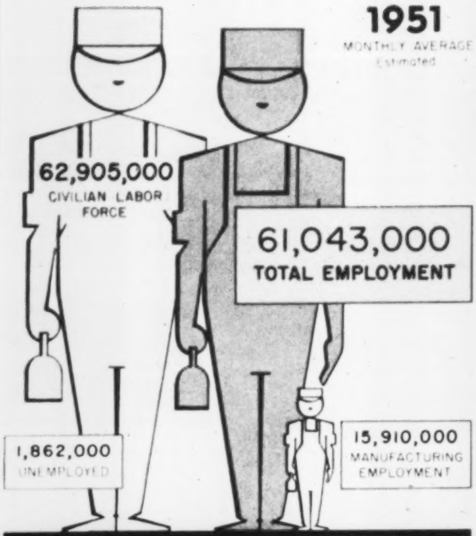
METALWORKING EMPLOYMENT

(All Wage and Salary Workers, in Thousands)

	TOTAL	Primary Metals	Fabricated Metal Products	Machinery Except Electrical	Electrical Machinery	Trans-portation Equip.	Instru-ments etc.
1951							
Jan.	6,500	1,327	1,016	1,528	924	1,425	280
Feb.	6,620	1,331	1,022	1,557	931	1,493	286
Mar.	6,712	1,341	1,031	1,579	944	1,527	290
Apr.	6,725	1,344	1,033	1,592	941	1,520	295
May	6,711	1,347	1,026	1,598	930	1,513	297
June	6,743	1,357	1,019	1,611	932	1,525	299
July	6,657	1,341	994	1,595	920	1,508	299
Aug.	6,640	1,352	994	1,570	927	1,496	301
Sept.	6,673	1,345	991	1,579	943	1,509	306
Oct.	6,694	1,342	990	1,605	954	1,494	309
Nov.	6,732	1,342	982	1,616	955	1,526	311
1950 (Av.)	5,864	1,220	933	1,352	836	1,273	250
1949 (Av.)	5,480	1,101	859	1,311	759	1,212	238

U. S. Department of Labor

* Estimated.



TOTAL U.S. EMPLOYMENT

(In Thousands)

1951 By Months

	Civilian Labor Force	Total Employment	Unemployment	Mfg. Employment
Jan.	61,514	59,010	2,503	15,784
Feb.	61,313	58,905	2,407	15,978
Mar.	62,325	60,179	2,147	16,022
Apr.	61,789	60,044	1,744	15,955
May	62,803	61,193	1,609	15,853
June	63,783	61,803	1,980	15,956
July	64,382	62,526	1,856	15,813
Aug.	64,208	62,630	1,578	15,980
Sept.	63,186	61,580	1,606	16,020
Oct.	63,452	61,836	1,616	15,940
Nov.	63,164	61,336	1,828	15,861
Dec.	.....	.....	....	.....

1950 By Months

	Civilian Labor Force	Total Employment	Unemployment	Mfg. Employment
Jan.	61,427	56,947	4,480	13,980
Feb.	61,637	56,953	4,684	13,997
Mar.	61,675	57,551	4,123	14,103
Apr.	62,183	58,668	3,515	14,162
May	62,788	59,731	3,057	14,413
June	64,866	61,482	3,384	14,666
July	64,427	61,214	3,213	14,777
Aug.	64,867	62,367	2,500	15,450
Sept.	63,567	61,226	2,341	15,685
Oct.	63,704	61,764	1,940	15,827
Nov.	63,512	61,271	2,240	15,765
Dec.	62,538	60,308	2,229	15,789
1950 Av.	63,099	59,957	3,142	14,884

1949 By Months

	Civilian Labor Force	Total Employment	Unemployment	Mfg. Employment
Jan.	60,078	57,414	2,664	14,782
Feb.	60,388	57,168	3,221	14,649
Mar.	60,814	57,647	3,167	14,475
Apr.	60,835	57,819	3,016	14,177
May	61,983	58,694	3,289	13,877
June	63,398	59,619	3,778	13,884
July	63,815	59,720	4,095	13,787
Aug.	63,637	59,947	3,689	14,114
Sept.	62,763	59,411	3,351	14,312
Oct.	62,576	59,001	3,576	13,892
Nov.	62,927	59,518	3,409	13,807
Dec.	62,045	58,556	3,489	14,031
1949 Av.	62,105	58,710	3,395	14,146

MONTHLY AVERAGES

	Civilian Labor Force	Total Employment	Unemployment	Mfg. Employment
1948	61,442	59,378	2,064	15,286
1947	60,168	58,027	2,142	15,247
1946	57,520	55,250	2,270	14,461
1945	53,860	52,820	1,040	15,302
1944	54,630	53,960	670	17,111
1943	55,540	54,470	1,070	17,381
1942	56,410	53,750	2,660	15,051
1941	55,910	50,350	5,560	12,974
1940	55,640	47,520	8,120	10,780
1939	55,230	45,750	9,480	10,078
1938	54,610	44,220	10,390	9,253
1937	54,000	46,300	7,700	10,606
1936	53,440	44,410	9,030	9,653

U. S. Department of Labor
U. S. Department of Commerce

Steel Employment, Wages, Hours and Payrolls

1951 By Months

	Number Employees	Av. Hrly. Earnings	Av. Hrs. per Week	Total Payrolls
Jan.	657,200	$1.933	41.6	$245,294,000
Feb	662,700	1.916	40.4	219,412,000
Mar	663,100	1.920	40.4	238,318,000
Apr	665,700	1.926	40.5	234,769,000
May	667,300	1.942	41.6	249,007,000
June*	674,200	1.950	40.5	240,707,000
July	678,200	1.955	37.3	231,951,000
Aug	679,100	1.931	40.4	246,670,000
Sept	676,700	1.974	39.1	236,322,000
Oct	674,000	1.931	41.4	249,856,000
Nov				
Dec				

1950 By Months

	Number Employees	Av. Hrly. Earnings	Av. Hrs. per Week	Total Payrolls
Jan	609,400	$1.720	38.5	$189,346,000
Feb	613,400	1.704	38.8	174,723,000
Mar	615,600	1.697	38.8	189,964,000
Apr	621,100	1.707	38.5	186,185,000
May	628,200	1.722	39.7	199,905,000
June	635,900	1.714	39.3	195,332,000
July	643,000	1.744	35.5	188,711,000
Aug	648,900	1.717	39.7	206,623,000
Sept	649,500	1.757	39.4	203,783,000
Oct	650,400	1.726	40.7	212,187,000
Nov	653,200	1.763	39.8	208,000,000
Dec	657,000	1.960	38.9	235,000,000
Year 1950	635,500	1.746	39.0	$2,389,759,000

1949 By Months

	Number Employees	Av. Hrly. Earnings	Av. Hrs. per Week	Total Payrolls
Jan	650,200	$1.712	38.9	$202,057,000
Feb	652,800	1.696	40.1	189,751,000
Mar	651,700	1.685	40.6	207,152,000
Apr	646,600	1.688	38.5	191,886,000
May	637,400	1.697	37.0	188,439,000
June	624,500	1.684	37.6	181,787,000
July	609,600	1.699	31.8	160,301,000
Aug	603,100	1.682	36.5	175,607,000
Sept	600,200	1.712	36.8	173,450,000
Oct.-Nov	583,800	1.782	17.7	206,590,000
Dec	602,400	1.706	38.1	184,750,000
Year 1949	620,500	1.703	34.5	$2,061,770,000

1948 By Months

	Number Employees	Av. Hrly. Earnings	Av. Hrs. per Week	Total Payrolls
Jan.	622,000	$1.573	39.6	$180,253,000
Feb	626,200	1.551	39.1	167,600,000
Mar	628,800	1.548	40.6	183,045,000
Apr	626,200	1.551	38.0	168,500,000
May	627,600	1.577	38.0	175,300,000
June	633,600	1.569	39.9	179,483,000
July	641,000	1.645	36.4	179,846,000
Aug	644,500	1.689	38.1	193,800,000
Sept	641,000	1.718	40.1	199,400,000
Oct	644,100	1.699	39.5	201,668,000
Nov	646,200	1.721	39.8	199,800,000
Dec	647,600	1.694	40.0	205,848,000
Year 1948	635,600	1.630	39.1	$2,234,461,000

MONTHLY AVERAGES

(Total Payrolls)

	Number Employees	Av. Hrly. Earnings	Av. Hrs. per Week	Total Payrolls
1950	635,500	$1.746	39.0	$2,389,759,000
1949	620,500	1.703	34.5	2,061,770,000
1948	635,600	1.630	39.1	2,234,461,000
1947	616,300	1.513	38.6	1,986,600,000
1946	575,300	1.347	35.1	1,544,142,000
1945	551,200	1.248	44.2	1,645,332,700
1944	571,200	1.219	46.7	1,745,019,700
1943	625,700	1.135	43.0	1,649,227,000
1942	647,200	1.056	38.9	1,467,058,700
1941	633,000	.959	38.6	1,301,347,800
1940	546,800	.850	36.2	960,779,300
1939	482,585	.840	34.8	812,775,082
1938	442,739	.830	27.6	613,198,987
1937	572,244	.818	36.8	976,083,169
1936	499,704	.668	39.8	758,059,542

American Iron & Steel Institute

Labor

METALWORKING FACTS AND FIGURES

Labor Turn-Over

Rates Per 100 Employees in Manufacturing Industries[1]

	SEPARATIONS									
	Quit		Discharge		Lay-Off		Miscellaneous		Total	
	1951	1950	1951	1950	1951	1950	1951	1950	1951	1950
Jan	2.1	1.1	0.3	0.2	1.0	1.7	0.7	0.1	4.1	3.1
Feb	2.1	1.0	0.3	0.2	0.8	1.7	0.6	0.1	3.8	3.0
Mar	2.5	1.2	0.3	0.2	0.8	1.4	0.5	0.1	4.1	2.9
Apr	2.7	1.3	0.4	0.2	1.0	1.2	0.5	0.1	4.6	2.8
May	2.8	1.6	0.4	0.3	1.2	1.1	0.4	0.1	4.8	3.1
June	2.5	1.7	0.4	0.3	1.0	0.9	0.4	0.1	4.3	3.0
July	2.4	1.8	0.3	0.3	1.3	0.6	0.4	0.2	4.4	2.9
Aug	3.1	2.9	0.4	0.4	1.4	0.6	0.4	0.3	5.3	4.2
Sept	3.1	3.4	0.3	0.4	1.3	0.7	0.4	0.4	5.1	4.9
Oct	2.4	2.7	0.4	0.4	1.3	0.8	0.4	0.4	4.5	4.3
Nov		2.1		0.3		1.1		0.3		3.8
Dec		1.7		0.3		1.3		0.3		3.6

ACCESSIONS

	1951	1950		1951	1950		1951	1950
Jan	5.2	3.6	May	4.5	4.4	Sept	4.3	5.7
Feb	4.5	3.2	June	4.9	4.8	Oct.	4.3	5.2
Mar	4.6	3.6	July	4.2	4.7	Nov		4.0
Apr	4.5	3.5	Aug	4.5	6.6	Dec		3.0

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[1] U. S. Department of Labor

Wages and Hours in Selected Industries

(Production Workers)

Stamped and Pressed Metal Products

	EARNINGS (Hourly Avg.)		HOURS (Weekly Avg.)	
	1951	1950	1951	1950
Jan	$1.675	$1.557	41.5	40.7
Feb	1.689	1.532	41.3	40.7
Mar	1.718	1.534	41.6	40.8
Apr	1.713	1.531	41.0	41.1
May	1.706	1.550	40.4	41.0
June	1.725	1.575	41.2	42.1
July	1.742	1.585	39.5	41.3
Aug	1.734	1.608	39.8	42.2
Sept		1.634		41.9
Oct		1.645		41.7
Nov		1.650		41.6
Dec		1.674		42.2

Metalworking Machinery

(Except Machine Tools)

Jan	$1.768	$1.576	43.5	39.3
Feb	1.790	1.606	44.6	41.2
Mar	1.796	1.613	44.7	41.6
Apr	1.807	1.634	45.7	42.2
May	1.802	1.636	45.6	42.6
June	1.808	1.634	45.4	42.9
July	1.827	1.656	45.1	43.4
Aug	1.804	1.648	45.5	44.3
Sept		1.670		42.9
Oct		1.677		43.6
Nov		1.698		43.4
Dec		1.731		44.2

Machine Tools

Jan	$1.729	$1.522	47.3	39.2
Feb	1.740	1.535	47.5	40.3
Mar	1.749	1.544	47.4	40.8
Apr	1.760	1.555	47.8	41.6
May	1.769	1.566	47.7	41.8
June	1.772	1.574	47.4	42.3
July	1.757	1.581	46.5	42.3
Aug	1.816	1.610	47.0	44.2
Sept		1.638		44.1
Oct		1.680		45.7
Nov		1.696		45.7
Dec		1.724		46.9

Fabricated Structural Metal Products

Jan	$1.639	$1.500	42.2	40.2
Feb	1.653	1.499	42.0	39.9
Mar	1.663	1.502	42.4	40.2
Apr	1.683	1.510	42.7	40.6
May	1.676	1.515	42.7	40.7
June	1.677	1.528	42.6	41.0
July	1.675	1.531	41.7	40.1
Aug	1.681	1.540	42.6	41.7
Sept		1.563		41.6
Oct		1.566		42.1
Nov		1.570		42.2
Dec		1.616		42.0

Agricultural Machinery and Tractors

	EARNINGS (Hourly Avg.)		HOURS (Weekly Avg.)	
	1951	1950	1951	1950
Jan.	$1.748	$1.575	41.1	39.1
Feb	1.747	1.581	40.8	40.0
Mar	1.782	1.589	41.0	39.6
Apr	1.793	1.586	41.1	39.7
May	1.792	1.593	40.9	40.1
June	1.810	1.588	41.0	40.2
July	1.794	1.593	40.7	40.1
Aug	1.788	1.620	39.9	40.3
Sept		1.589		40.5
Oct		1.641		39.5
Nov		1.671		40.4
Dec		1.710		41.4

Automobiles

Jan.	$1.847	$1.715	38.7	40.9
Feb	1.862	1.708	39.9	39.6
Mar	1.889	1.710	40.3	40.4
Apr	1.877	1.748	39.7	42.2
May	1.882	1.731	39.8	41.4
June	1.925	1.770	38.9	42.8
July	1.941	1.766	38.0	42.1
Aug	1.944	1.778	39.6	42.3
Sept		1.818		40.6
Oct		1.830		41.1
Nov		1.842		39.5
Dec		1.865		40.9

Aircraft and Parts

Jan.	$1.757	$1.602	43.7	40.7
Feb	1.752	1.614	43.3	40.7
Mar	1.762	1.612	43.9	40.5
Apr	1.753	1.612	44.0	40.3
May	1.759	1.608	43.9	40.8
June	1.765	1.605	43.8	40.7
July	1.775	1.615	43.7	41.2
Aug	1.781	1.626	43.5	42.4
Sept		1.667		42.7
Oct		1.675		41.9
Nov		1.693		42.4
Dec		1.734		43.3

Gray Iron Foundries

Jan.	$1.620	$1.473	43.6	39.2
Feb	1.637	1.484	42.7	39.7
Mar	1.663	1.484	43.4	40.3
Apr	1.656	1.502	42.8	41.3
May	1.657	1.513	42.7	41.8
June	1.658	1.515	42.5	42.3
July	1.654	1.521	41.4	42.0
Aug	1.658	1.536	41.2	43.2
Sept		1.559		43.6
Oct		1.586		44.3
Nov		1.594		43.4
Dec		1.621		44.4

Labor Union Membership

Thousands of Members

Year	American Federation of Labor	Congress of Industrial Organizations	Independent or Unaffiliated Unions	Total
1950	7,143	n.a.	2,400-2,800	14,000-16,000
1949	7,241	n.a.	2,000-2,300	14,000-16,000
1948	7,221	n.a.	2,200-2,500	14,000-16,000
1947	7,578	6,000	1,836	15,414
1946	7,152	6,000	1,822	14,974
1945	6,931	6,000	1,865	14,796
1944	6,807	5,935	1,879	14,621
1943	6,564	5,285	1,793	13,642
1942	5,483	4,195	1,084	10,762
1941	4,569	5,000	920	10,489
1940	4,247	3,625	1,072	8,944
1939	4,006	4,000	974	8,980
1938	3,623	4,038	604	8,265
1937	2,861	3,718	639	7,218
1936	3,422	....	742	4,164
1935	3,045	....	683	3,728
1934	2,608	....	641	3,249
1933	2,127	....	730	2,857
1932	2,532	....	694	3,226
1931	2,890	....	636	3,526
1930	2,961	....	671	3,632
1929	2,934	....	691	3,625
1928	2,896	....	671	3,567
1927	2,813	....	787	3,600
1926	2,804	....	788	3,592
1925	2,877	....	689	3,566
1924	2,866	....	683	3,549
1923	2,926	....	703	3,629
1922	3,196	....	754	3,950
1921	3,907	....	815	4,722
1920	4,079	....	955	5,034
1919	3,260	....	786	4,046
1918	2,726	....	642	3,368
1917	2,371	....	605	2,976
1916	2,073	....	649	2,722
1915	1,946	....	614	2,560
1914	2,021	....	626	2,647
1913	1,996	....	665	2,661
1912	1,770	....	635	2,405
1911	1,762	....	556	2,318
1910	1,562	....	554	2,116
1909	1,483	....	482	1,965
1908	1,587	....	505	2,092
1907	1,539	....	538	2,077
1906	1,454	....	438	1,892
1905	1,494	....	424	1,918
1904	1,676	....	391	2,067
1903	1,466	....	358	1,824
1902	1,024	....	311	1,335
1901	788	....	270	1,058
1900	548	....	243	791
1899	349	....	201	550
1898	278	....	189	467
1897	265	....	175	440

U. S. Department of Labor

n.a. = Not available

Trade

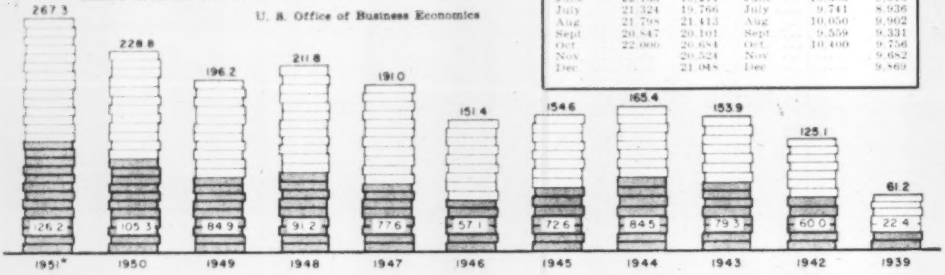
METALWORKING FACTS AND FIGURES

ANNUAL SALES TOTALS

(BILLIONS OF DOLLARS)

Entire Bar = All Manufacturing Industries
Shaded Area = Durable Goods Industries

U. S. Office of Business Economics



1951-1950 By Months

(Millions of Dollars, Seasonally Adjusted)

All Manufacturing Industries	1951	1950	Durable Goods Industries	1951	1950
Jan	22,560	15,915	Jan	10,430	7,092
Feb	22,261	16,579	Feb	10,390	7,332
Mar	22,605	17,230	Mar	10,851	7,679
Apr	22,479	17,255	Apr	10,739	7,813
May	23,434	18,988	May	11,150	8,898
June	22,133	19,271	June	10,383	9,046
July	21,324	19,766	July	9,741	8,936
Aug	21,798	21,413	Aug	10,050	9,902
Sept	20,847	20,101	Sept	9,559	9,331
Oct	22,000	20,684	Oct	10,400	9,756
Nov		20,524	Nov		9,682
Dec		21,048	Dec		9,869

Inventories at End of Month

Millions of Dollars, Seasonally Adjusted

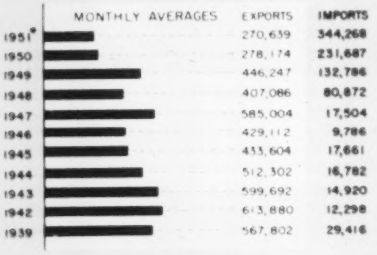
	All Manufacturing Industries		Durable Goods Industries	
	1951	1950	1951	1950
January	34,120	28,707	16,877	13,878
February	34,657	28,472	17,251	13,808
March	35,557	28,432	17,576	13,784
April	36,908	28,599	18,171	13,878
May	38,068	28,830	18,923	14,014
June	39,009	29,123	19,598	14,216
July	39,894	29,104	20,289	14,188
August	40,756	29,253	20,926	14,205
September	40,987	30,123	21,306	14,486
October	41,300	30,947	21,600	14,899
November		32,245		15,644
December		33,253		16,359

U. S. Office of Business Economics

IRON & STEEL PRODUCTS

EXPORTS AND IMPORTS

Excluding Advanced Manufactures—Net Tons



1951-1950 By Months

	—Exports—		—Imports—	
	1951	1950	1951	1950
January	305,897	298,496	479,284	69,136
February	267,309	282,076	403,146	51,136
March	353,346	273,017	406,191	97,848
April	299,794	258,084	387,851	102,857
May	296,948	290,000	377,895	136,730
June	280,656	346,392	292,784	182,152
July	287,235	249,671	315,363	182,520
August	306,271	252,086	279,818	299,929
September	350,838	281,102	257,741	256,874
October	......	263,097	......	451,097
November	......	283,137	......	467,063
December	......	260,925	......	482,903

U. S. Office of Business Economics

Manufacturers' New Orders

Value—Millions of Dollars

1951	Total Durables	Primary Metals	Fab. Metal Products	Electrical Mchy.	Mchy. Except Elec.	Transptn. Equip. Except Motor Veh.	Other† Durables	—Total Durables— 1950	1949	1948
Jan.	15,050	2,396	1,698	1,402	2,680	3,793	3,082	7,570	6,443	7,083
Feb.	13,474	2,110	1,476	1,399	2,810	2,956	2,723	7,224	6,394	6,625
Mar.	15,542	2,587	1,441	1,732	2,644	4,128	3,009	8,611	7,098	7,901
Apr.	12,987	2,264	1,282	1,304	2,304	3,199	2,634	7,893	5,869	7,193
May	12,404	2,175	1,147	1,246	2,308	3,198	2,331	8,693	5,729	6,456
June	13,303	1,977	1,091	1,453	2,291	4,349	2,143	10,368	6,358	8,315
July	11,274	2,037	937	1,284	2,259	2,453	2,305	11,032	5,807	7,621
Aug.	11,046	2,002	1,090	1,064	2,180	2,330	2,380	14,305	6,989	7,985
Sept.	9,880	1,487	1,074	1,207	1,745	2,154	2,213	12,061	7,324	7,850
Oct.	11,387	2,352	1,056	1,164	1,838	2,526	2,451	12,220	6,885	7,641
Nov.								10,362	6,778	7,284
Dec.								11,703	7,010	7,422

† Other durables include motor vehicles and equipment, professional and scientific instruments, lumber, furniture, stone, clay, glass and miscellaneous industries.
U. S. Office of Business Economics

Foreign Trade

Value—Millions of Dollars

	—Exports—			—Imports—		
	1951	1950	1949	1951	1950	1949
Jan.	974	741	1,104	1,023	623	590
Feb.	1,076	764	1,043	909	600	567
Mar.	1,284	860	1,189	1,100	665	633
Apr.	1,372	803	1,172	1,032	585	534
May	1,355	829	1,095	1,018	659	541
June	1,292	877	1,107	929	686	526
July	1,189	779	900	894	709	456
Aug.	1,267	762	884	880	820	491
Sept.	1,230	911	910	718	862	530
Oct.	1,154	906	853	832	923	557
Nov.		978	841	....	854	593
Dec.		1,065	944	....	867	605

U. S. Bureau of the Census

Monthly Averages

	Exports	Imports
1951*	1,232	917
1950	856	737
1949	1,003	552
1948	1,054	594
1947	1,278	480
1946	812	412
1945	817	347
1944	1,188	327
1943	1,080	282
1942	673	230
1941	429	279
1940	335	219
1939	265	193

Iron and Steel Scrap

(Net Tons)

	—Exports—		—Imports—	
	1951	1950	1951	1950
Jan.	9,766	13,552	66,902	33,468
Feb.	18,339	17,177	46,017	3,606
Mar.	19,683	14,481	54,489	15,832
Apr.	22,651	18,151	22,260	18,408
May	21,337	18,575	19,086	21,090
June	15,063	15,719	14,102	45,220
July	23,004	14,357	28,993	26,102
Aug.	23,670	12,537	26,074	121,140
Sept.	26,902	29,006	17,116	94,601
Oct.		21,122		123,831
Nov.		25,808		128,456
Dec.		16,479		106,044

U. S. Office of Business Economics

Monthly Averages

	Exports	Imports
1951*	18,800	37,000
1950	18,117	60,871
1949	24,883	91,994
1948	20,308	34,589
1947	16,185	3,016
1946	12,424	2,519
1945	7,978	3,856
1944	7,973	9,070
1943	4,575	11,955
1942	11,811	7,680
1941	75,354	5,997
1940	263,274	189
1939	334,548	2,753

* Estimated

Trade

METALWORKING FACTS AND FIGURES

Businesses in Operation

(In Thousands at End of Quarter)

	Total	Contract Construction	Manufacturing	Service
1951				
First Qtr	4,007.4	372.3	306.7	857.2
Second Qtr	......	.....	.....	.....
1950 (Avg.)	3,981.3	358.4	302.9	854.7
First Qtr	3,968.4	350.4	302.5	854.4
Second Qtr	3,986.1	362.4	303.5	854.4
Third Qtr	3,997.7	366.9	303.3	856.2
Fourth Qtr	3,992.9	368.6	302.1	855.2
Annual Averages				
1949	3,964.8	335.0	312.0	853.0
1948	3,990.7	321.0	329.6	857.4
1947	3,879.0	289.3	330.6	830.6
1946	3,605.4	242.6	301.9	772.8
1945	3,258.4	176.8	262.8	706.0
1944	3,062.2	153.4	245.2	657.1
1943	3,045.1	157.5	238.8	625.5
1942	3,302.2	177.2	237.9	699.2
1941	3,363.6	186.8	235.3	705.8
1940	3,382.8	199.2	226.7	718.3
1939	3,305.6	199.7	223.0	701.8

U. S. Office of Business Economics

New Business Incorporations

	1951	1950	1949	1948	1947
January	8,515	9,070	7,906	11,000	12,112
February	6,590	7,736	6,362	7,873	9,111
March	7,649	9,180	7,637	9,346	10,247
April	7,653	8,375	7,273	9,223	9,802
May	7,544	9,216	7,445	8,246	9,179
June	6,810	8,861	7,260	8,550	8,922
July	6,428	7,191	6,424	7,690	9,041
August	6,496	7,201	6,828	6,723	8,055
September	5,950	6,277	6,867	6,930	8,561
October	6,812	6,782	6,877	6,686	9,609
November	.....	6,256	6,755	6,413	7,873
December	.....	6,780	7,857	7,421	10,126
Total	.....	92,925	85,491	96,101	112,638
Monthly Avg.	7,045	7,744	7,124	8,008	9,387

Dun & Bradstreet Inc.

Discontinued Businesses

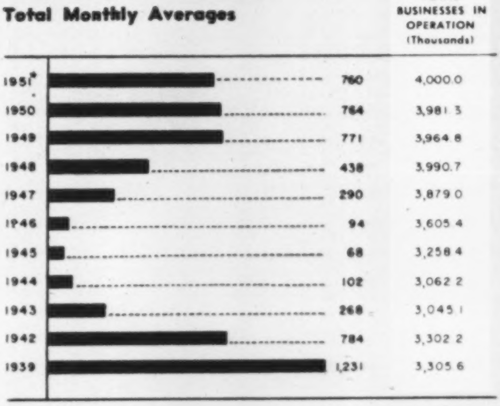
(Thousands)

	Total	Contract Construction	Manufacturing	Service
1951				
First Qtr	100.2	14.3	10.8	18.3
Second Qtr	...	...	...	...
1950 (Avg.)	91.3	11.4	10.5	18.1
First Qtr	92.4	11.3	10.6	18.4
Second Qtr	96.4	10.4	11.2	20.1
Third Qtr	83.6	10.3	10.5	16.0
Fourth Qtr	92.8	13.6	9.8	18.0
Annual Averages				
1949	96.6	11.7	13.3	18.8
1948	92.7	10.8	11.9	19.8
1947	72.9	9.1	10.3	15.2
1946	56.6	6.7	7.3	12.8
1945	50.7	4.5	6.7	11.6

U. S. Office of Business Economics

BUSINESS FAILURES

Total Monthly Averages

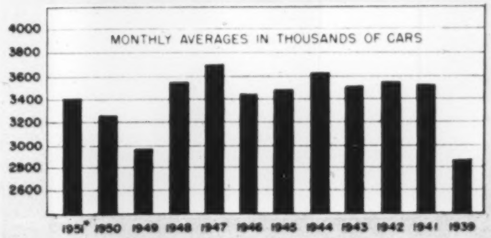


Failures—Liabilities

	FAILURES			LIABILITIES	
1951	Total	Construction	Mfg., Mining	Construction	Mfg., Mining
January	775	97	132	$2,393,000	$5,175,000
February	599	60	107	2,228,000	6,134,000
March	732	83	115	3,392,000	5,169,000
April	693	81	119	2,268,000	5,894,000
May	755	94	128	4,655,000	5,497,000
June	699	71	139	3,065,000	5,014,000
July	665	74	130	2,686,000	7,790,000
August	678	89	136	4,290,000	10,497,000
September	620	84	150	4,668,000	14,908,000
October	644	85	150	1,937,000	12,444,000
November	587	68	106	3,740,000	6,158,000
December	...	..	...	....	....
Monthly Averages					
1951*	760	..	...	....	....
1950	764	76	173	2,138,000	7,925,000
1949	771	70	194	2,270,000	11,939,000
1948	438	37	123	1,301,000	10,858,000
1947	290	20	106	601,000	11,894,000
1946	94	12	39	362,000	3,241,000
1945	68	8	23	297,000	1,437,000
1944	102	14	29	198,000	1,681,000
1943	268	33	47	455,000	1,588,000
1942	784	62	135	853,000	2,600,000
1939	1,231	54	243	919,000	5,929,000

Dun & Bradstreet Inc.

FREIGHT CARLOADINGS



1951—By Weeks

Jan. 6	662,444	May 12	806,127	Sept. 15	850,812
Jan. 13	783,025	May 19	809,475	Sept. 22	864,310
Jan. 20	779,816	May 26	811,799	Sept. 29	864,573
Jan. 27	784,185	June 2	744,644	Oct. 6	858,750
Feb. 3	651,124	June 9	813,326	Oct. 13	868,683
Feb. 10	823,163	June 16	826,239	Oct. 20	886,648
Feb. 17	740,557	June 23	832,942	Oct. 27	863,961
Feb. 24	734,794	June 30	821,615	Nov. 3	837,743
Mar. 3	785,867	July 7	588,246	Nov. 10	791,403
Mar. 10	749,627	July 14	779,454	Nov. 17	814,435
Mar. 17	745,365	July 21	804,570	Nov. 24	711,447
Mar. 24	748,804	July 28	819,875	Dec. 1	821,776
Mar. 31	755,435	Aug. 4	813,366	Dec. 8	773,520
Apr. 7	739,523	Aug. 11	809,354	Dec. 15	753,194
Apr. 14	777,989	Aug. 18	829,398	Dec. 22	......
Apr. 21	809,520	Aug. 25	838,587	Dec. 29	......
Apr. 28	824,662	Sept. 1	829,391		
May 5	808,337	Sept. 8	732,908		

Association of American Railroads

* Estimated

WHAT IS A SMALL MANUFACTURER?

This U. S. Department of Commerce table indicates the maximum number of employees for a manufacturing establishment to be considered small. Industries are listed under U. S. Standard Industrial Classification.

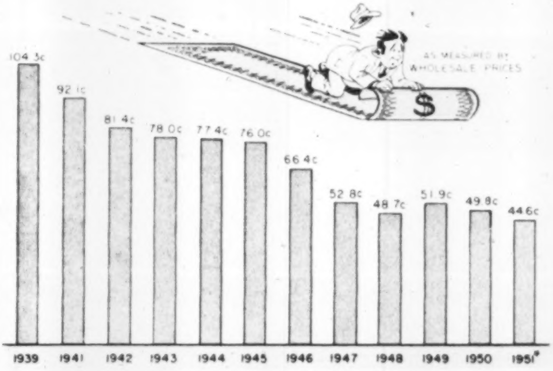
S.I.C. Code	Industry	Maximum Employees
	PRIMARY METAL INDUSTRIES	
3334	Aluminum, primary	1,000
3352	Aluminum rolling and drawing	1,500
3311	Blast furnaces	500
3331	Copper, primary	400
3351	Copper rolling and drawing	1,000
3313	Electrometallurgical products	750
3321	Foundries, gray iron	200
3322	Foundries, malleable iron	400
3361	Foundries, nonferrous	100
3323	Foundries, steel	400
3391	Iron and steel forgings	250
3332	Lead, primary	400
3399	Metal industries, primary, n.e.c.	200
3359	Nonferrous metal rolling, n.e.c.	250
3339	Nonferrous metals, primary, n.e.c.	200
3341	Nonferrous metals, secondary	100
3393	Pipe, welded and heavy-riveted	400
3312	Steel works and rolling mills	2,500
3392	Wire drawing	750
3333	Zinc, primary	750
	FABRICATED METAL PRODUCTS	
3491	Barrels, drums and pails, metal	200
3443	Boiler shop products	200
3494	Bolts, nuts, washers and rivets	300
3421	Cutlery	300
3442	Doors, sash and trim, metal	200
3465	Enameling and lacquering	100
3467	Engraving on metal	100
3424	Files	1,000
3471	Fixtures, lighting	100
3431	Fixtures and fittings, metal plumbing	300
3497	Foil, metal	200
3466	Galvanizing	100
3429	Hardware, n.e.c.	300
3439	Heating and cooking apparatus, n.e.c.	300
3499	Metal products, fabricated, n.e.c.	100
3481	Nails and spikes	100
3432	Oil burners	100
3468	Plating and polishing	100
3492	Safes and vaults	750
3425	Saws, hand and saw blades	250
3495	Screw-machine products	100
3444	Sheet-metal work	100
3463	Stampings, metal	200
3493	Steel springs	200
3441	Structural and ornamental products	100
3411	Tin cans and other tinware	400
3422	Tools, edge	100
3423	Tools, hand, n.e.c.	200
3496	Tubes, collapsible	300
3461	Vitreous-enameled products	300
3489	Wirework, n.e.c.	200
	MACHINERY (Except Electrical)—	
3593	Bearings, ball and roller	1,500
3564	Blowers and fans	200
3571	Computing and related machines	2,500
3531	Construction and mining machinery	400
3563	Conveyors	300
3562	Elevators and escalators	400
3519	Engines, internal-combustion	1,500
3511	Engines and turbines, steam	2,500
3522	Farm machinery, (except tractors)	250
3551	Food-products machinery	150
3567	Furnaces and ovens, industrial	150
3569	General industrial machinery, n.e.c.	200
3582	Laundry and dry-cleaning machinery	250
3581	Laundry equipment, domestic	1,000
3599	Machine shops	100
3532	Machinery and tools, oil-field	250
3542	Metalworking machinery, n.e.c.	400
3579	Office and store machines, n.e.c.	300
3554	Paper-industries machinery	250
3592	Pipe and fittings, fabricated	100
3566	Power-transmission equipment	300
3555	Printing-trades machinery	300
3561	Pumps and compressors	300
3586	Pumps, measuring and dispensing	1,000
3585	Refrigeration machinery	1,000
3576	Scales and balances	200
3589	Service and household machines, n.e.c.	150
3583	Sewing machines	1,000
3559	Special industry machinery, n.e.c.	100
3568	Stokers, mechanical	250
3552	Textile machinery	250
3543	Tools, cutting, jigs, fixtures, etc.	100
3541	Tools, machine	400
3521	Tractors	2,500
3565	Trucks and tractors, industrial	250
3572	Typewriters	2,500
3584	Vacuum cleaners	1,500
3591	Valves and fittings, except plumbers'	400
3553	Woodworking machinery	100
	ELECTRICAL MACHINERY	
3621	Appliances, electrical	500
3692	Batteries, primary (dry and wet)	500
3691	Batteries, storage	200
3612	Carbon and graphite products	750
3669	Communication equipment, n.e.c.	400
3616	Electrical control apparatus	750
3619	Electrical industrial apparatus, n.e.c.	150
3699	Electrical products, n.e.c.	250
3617	Electrical welding apparatus	150
3641	Engine electrical equipment	2,500
3613	Instruments, electrical measuring	750
3651	Lamps, electric	500
3614	Motors and generators	1,500
3663	Phonograph records	300
3661	Radios and related products	750
3664	Telephone and telegraph equipment	2,500
3615	Transformers	1,000
3662	Tubes, electronic	750
3631	Wire and cable, insulated	300
3611	Wiring devices and supplies	300
3693	X-ray and therapeutic apparatus	250
	TRANSPORTATION EQUIPMENT	
3721	Aircraft	2,500
3722	Aircraft engines	2,500
3729	Aircraft equipment, n.e.c.	250
3723	Aircraft propellers	1,500
3732	Boat building and repairing	100
3741	Locomotives and parts	2,500
3751	Motorcycles and bicycles	750
3717	Motor vehicles and parts	2,500
3742	Railroad and street cars	1,500
3731	Ship building and repairing	1,000
3799	Transportation equipment, n.e.c.	100
3713	Truck and bus bodies	150
3716	Trailers, automobile	100
3715	Trailers, truck	200
	FURNITURE AND FIXTURES	
2599	Furniture and fixtures, n.e.c.	100
2514	House furniture, metal, except upholstered	150
2519	Household furniture, n.e.c.	100
2512	Household furniture, upholstered	100
2515	Mattresses and bedsprings	100
2522	Office furniture, metal	400
2541	Partitions and fixtures	100
2532	Professional furniture	200
2531	Public building furniture	200
2591	Restaurant furniture	100
2561	Screens, window and door	100
2563	Venetian blinds	100
	INSTRUMENTS AND RELATED PRODUCTS	
3842	Appliances and supplies, surgical	200
3843	Dental equipment and supplies	150
3831	Instruments and lenses, optical	200
3821	Instruments, mechanical measuring	500
3811	Instruments, scientific	300
3841	Instruments, surgical and medical	100
3851	Ophthalmic goods	250
3861	Photographic equipment	1,000
3872	Watchcases	150
3871	Watches and clocks	500
	PETROLEUM AND COAL PRODUCTS	
2931	Coke ovens, beehive	100
2932	Coke ovens, byproduct	400
	STONE, CLAY AND GLASS PRODUCTS	
3291	Abrasive products	250
3292	Asbestos products	400
3255	Clay refractories	150
3293	Gaskets and asbestos insulations	250
3297	Refractories, nonclay	250
	MISCELLANEOUS MANUFACTURES	
3939	Instruments musical, n.e.c.	100
3912	Jewelers' findings	100
3986	Jewelry and instrument cases	150
3961	Jewelry, costume	100
3911	Jewelry (precious metal)	100
3964	Needles, pins, and fasteners	250
3932	Organs	150
3951	Pens and mechanical pencils	400
3933	Piano and organ parts	200
3931	Pianos	400
3914	Silverware and plated ware	300
3989	Small arms	750
3990	Smal arms ammunition	2,500
3997	Soda-fountain and bar equipment	100
3943	Vehicles, children's	200

n.e.c. = Not elsewhere classified.

Finance

METALWORKING FACTS AND FIGURES

PURCHASING POWER OF THE DOLLAR



AS MEASURED BY:

	Wholesale Prices	Consumers' Prices	Retail Food Prices
1951*	44.6	53.9	44.1
Jan.	44.6	55.1	45.1
Feb.	43.8	54.4	44.2
Mar.	43.7	54.2	44.2
Apr.	43.8	54.2	44.3
May	44.0	53.9	44.0
June	44.2	54.0	44.1
July	44.8	53.9	43.9
Aug.	45.2	53.9	44.1
Sept.	45.3	53.6	44.0
Oct.	45.1	53.4	43.6

Monthly Averages

	Wholesale Prices	Consumers' Prices	Retail Food Prices
1950	49.8	58.2	48.9
1949	51.9	58.8	49.5
1948	48.7	58.2	47.6
1947	52.8	62.7	51.5
1946	66.4	71.7	62.6
1945	76.0	77.8	71.8
1944	77.4	79.6	73.4
1943	78.0	80.8	72.4
1942	81.4	85.8	80.6
1939	104.3	100.6	104.9

U. S. Office of Business Economics

National Income

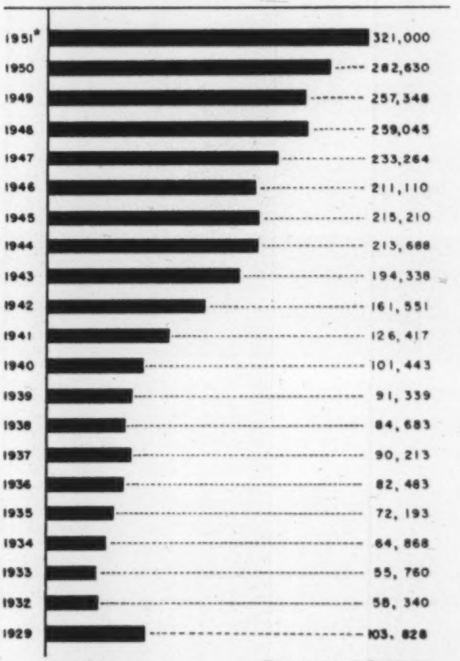
(Millions of Dollars)

1951*	272,000
1950	238,963
1949	216,716
1948	223,469
1947	198,688
1946	180,286
1945	182,691
1944	183,838
1943	169,686
1942	137,119
1941	103,834
1940	81,347
1939	72,532
1938	67,375
1937	73,627
1936	64,719
1935	56,789
1934	48,613
1933	39,584
1932	41,690
1931	58,873
1929	87,355

* Estimated.
Dept. of Com.

GROSS NATIONAL PRODUCT OR EXPENDITURE

(Millions of Dollars)



* Estimated. Department of Commerce

U. S. Revenues, Expenditures, Debt

Year	Net Receipts 000,000	Per Capita Receipts	Expenditures 000,000	Per Capita Expenditures	Gross Debt 000,000	Per Capita Debt
1951	$48,142	$312.36	$44,632	$289.59	$255,222	$1655.97
1950	37,043	244.42	40,167	265.03	257,357	1698.13
1949	38,246	256.68	40,057	268.83	252,770	1696.44
1948	44,746	306.24	36,326	248.61	252,292	1726.68
1947	44,703	311.77	42,505	296.44	258,376	1801.94
1946	43,037	305.25	65,018	461.17	269,422	1910.97
1945	46,456	332.78	100,404	719.25	258,682	1853.01
1944	44,149	319.92	93,743	679.29	201,003	1455.52
1943	22,281	163.25	78,182	572.83	136,696	1001.55
1942	12,799	95.25	32,491	241.80	72,422	537.35
1941	7,607	57.29	12,774	74.16	48,961	367.54
1940	5,387	44.09	9,127	70.65	42,967	325.63
1939	5,164	43.21	8,765	70.65	40,445	308.34
1938	5,854	47.89	7,304	59.70	37,167	285.43
1937	5,028	40.93	8,281	62.69	36,427	281.82
1936	4,115	32.17	9,068	69.41	33,545	261.20
1935	3,800	29.88	7,583	58.00	28,701	225.07
1934	3,115	24.64	6,370	56.19	27,053	213.65
1933	2,079	16.54	4,325	40.91	22,538	179.21
1932	2,005	16.06	4,948	41.28	19,487	155.93
1931	3,190	25.70	4,091	32.99	16,801	135.37
1930	4,177	33.01	3,994	32.42	16,185	131.49
1929	4,053	33.19	3,848	31.67	16,931	139.40
1928	4,042	33.73	3,643	30.40	17,604	146.69
1927	4,129	34.94	3,493	29.56	18,510	156.04
1926	3,962	33.98	3,584	30.76	19,643	167.70
1925	3,780	32.91	3,529	30.73	20,516	177.82
1924	4,012	35.44	3,507	30.98	21,251	186.86
1923	4,007	35.93	3,697	33.15	22,349	200.10
1922	4,109	37.40	3,795	34.54	22,964	208.97
1921	5,625	51.98	5,538	51.18	23,976	221.09
1920	6,695	62.83	6,482	60.84	24,297	228.32
1919	5,152	49.07	18,523	176.40	25,482	240.09
1918	3,664	35.38	12,697	122.58	12,243	115.65
1917	1,124	11.00	1,978	19.36	2,975	28.57
1916	782	7.77	734	7.29	1,225	11.96

Annual Statements of the Treasury

Corporate Income, Taxes, Dividends

(All Industries—Millions of Dollars)

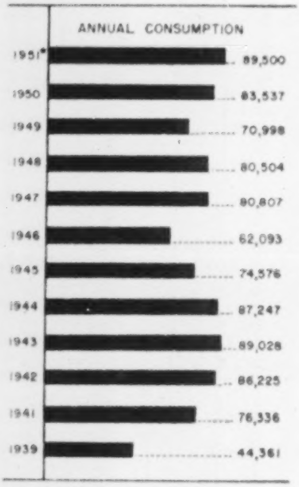
	Income Before Taxes	Taxes†	Income After Taxes	Dividend Payments	Undistributed Income
1951‡					
1st Qtr.	51,800	31,100	20,700		...
2nd Qtr.	45,400	27,000	18,400		
1950	41,367	18,593	22,774	9,169	13,605
1949	28,336	10,989	17,347	7,552	9,795
1948	33,762	13,028	20,734	7,250	13,484
1947	30,489	11,940	18,549	6,561	11,988
1946	23,464	9,583	13,881	5,808	8,073
1945	19,717	11,215	8,502	4,699	3,803
1944	24,333	13,525	10,808	4,680	6,128
1943	25,052	14,406	10,646	4,493	6,153

† Federal and state corporate income and excess profits tax liability.
‡ Seasonally adjusted quarterly totals at annual rates.
Department of Commerce.

Fuel-Power-Raw Materials

IRON ORE

(Lake Superior)



1951-1950 By Months

Thousands of Gross Tons

Consumption at U. S. and Canadian furnaces. Stocks at U. S. and Canadian furnaces and at Lake Erie docks.

	Consumption 1951	Consumption 1950	Stocks 1951	Stocks 1950
Jan.	7,327	6,764	30,227	32,004
Feb.	6,435	5,335	24,123	26,745
Mar.	7,372	5,971	17,335	20,865
Apr.	7,235	7,140	15,072	14,099
May	7,761	7,388	19,772	14,384
June	7,499	7,249	26,423	19,189
July	7,536	7,579	33,142	24,108
Aug.	7,699	7,371	39,920	29,966
Sept.	7,473	7,175	45,453	35,716
Oct.	7,749	7,415	50,229	39,711
Nov.	7,624	6,861	49,099	41,543
Dec.	.....	7,289	.....	37,169
Total	.....	83,537	.....	.....

Lake Superior Iron Ore Association

Iron Ore Production

All U. S. Districts

Thousands of Gross Tons

	1951	1950	1949	1948	1947
Jan	3,812	2,777	2,920	2,757	2,698
Feb	3,315	2,492	2,882	2,686	2,591
Mar	3,525	2,496	4,335	3,019	2,846
Apr	8,795	2,999	9,889	8,687	6,575
May	14,362	10,740	11,865	11,865	10,981
June	14,932	12,355	12,923	12,578	11,643
July	15,103	13,477	12,757	12,787	13,127
Aug	15,832	14,478	11,986	12,748	12,819
Sept	14,764	13,887	10,164	11,942	11,336
Oct	13,900	12,999	709	10,003	10,108
Nov		7,401	2,049	8,577	6,043
Dec		3,362	2,816	3,675	2,972
Total		99,463	85,295	101,324	93,739

U. S. Bureau of Mines

Coke Production

Net Tons

	Oven	Beehive	Total
1951*	71,900,000	7,350,000	79,250,000
Jan	6,076,872	714,956	6,791,828
Feb	5,398,562	602,976	6,001,538
Mar	6,041,790	650,670	6,692,460
Apr	5,910,775	573,483	6,484,258
May	6,122,225	624,938	6,747,163
June	5,942,955	631,666	6,574,621
July	6,104,023	532,312	6,636,335
Aug	6,152,299	625,521	6,777,820
Sept	5,923,388	544,692	6,468,080
Oct	6,114,103	620,074	6,734,174
Nov			
Dec			

	Oven	Beehive	Total
1950	66,568,621	5,700,041	72,268,662
Jan	5,357,740	124,294	5,482,034
Feb	3,956,139	37,967	3,994,106
Mar	4,978,608	302,052	5,280,660
Apr	5,662,620	493,674	6,156,294
May	5,868,380	528,652	6,397,032
June	5,657,494	580,573	6,238,067
July	5,912,000	506,600	6,418,600
Aug	5,812,400	659,200	6,471,600
Sept	5,710,200	619,700	6,329,900
Oct	6,006,270	643,665	6,649,935
Nov	5,666,213	577,757	6,243,970
Dec	5,980,557	625,907	6,606,464

YEARLY TOTALS

	Oven	Beehive	Total
1951*	71,900,000	7,350,000	79,250,000
1950	66,568,621	5,700,041	72,268,662
1949	60,222,481	3,414,948	63,637,429
1948	68,284,357	6,577,571	74,861,928
1947	66,758,549	6,687,301	73,445,850
1946	53,929,447	4,568,401	58,497,848
1945	62,094,288	5,213,893	67,308,181
1944	67,064,795	6,973,022	74,037,817
1943	63,742,676	7,933,387	71,676,063
1942	62,294,909	8,274,035	70,568,944
1941	58,482,422	6,704,156	65,186,578
1940	54,014,309	3,057,825	57,072,134
1939	42,882,313	1,444,328	44,326,641

U. S. Bureau of Mines
* Estimated

Iron Ore Imports

Thousands of Gross Tons

	1951	1950	1949	1948	1947
Jan	622	601	371	337	223
Feb	573	509	391	269	198
Mar	661	579	386	379	229
Apr	741	334	560	403	263
May	834	678	650	441	439
June	1,232	893	642	707	479
July	1,085	792	946	489	576
Aug	1,050	852	1,025	571	597
Sept	848	928	968	541	580
Oct		964	458	955	573
Nov		735	655	630	443
Dec		386	348	388	297
Total		8,251	7,400	6,110	4,897

U. S. Bureau of the Census

Fluorspar

1951—Net Tons

Qtrs	Production	Imports	Consumption	Stocks†
1st	73,327	36,457	122,137	175,852
2nd	88,810	45,158	121,974	169,200
3rd	92,100	27,688	123,216	170,707

YEARLY TOTALS

	Production	Imports	Consumption	Stocks†
1950	283,200	164,634	426,121	183,723
1949	238,400	95,619	345,221	167,660
1948	336,000	111,626	406,269	184,213
1947	343,700	78,379	376,138	147,251
1946	277,300	29,488	303,190	117,620
1945	325,200	100,726	356,090	123,011

U. S. Bureau of Mines † End of period

Iron & Steel Scrap

Thousands of Net Tons

CONSUMPTION

	1951 Home	1951 Purchased	1951 Total	1950 Home	1950 Purchased	1950 Total
Jan	3,321	3,372	6,692	2,956	2,539	5,495
Feb	2,963	3,015	5,978	2,677	2,407	5,084
Mar	3,457	3,473	6,930	2,992	2,722	5,714
Apr	3,331	3,375	6,707	2,988	2,745	5,733
May	3,370	3,458	6,828	3,115	2,858	5,973
June	3,187	3,190	6,377	2,956	2,781	5,737
July	3,043	2,892	5,934	2,760	2,513	5,273
Aug	3,240	3,048	6,288	3,078	2,748	5,826
Sept	3,127	2,896	6,023	3,026	2,764	5,790
Oct				3,288	3,032	6,320
Nov				3,019	2,910	5,929
Dec				3,092	2,912	6,004

CONSUMERS STOCKS†

	1951 Home	1951 Purchased	1951 Total	1950 Home	1950 Purchased	1950 Total
Jan	1,337	4,125	5,462	1,548	3,852	5,400
Feb	1,301	3,647	4,948	1,468	3,686	5,154
Mar	1,220	3,211	4,431	1,343	3,397	4,740
Apr	1,104	3,111	4,215	1,315	3,196	4,511
May	1,123	3,031	4,154	1,371	3,275	4,646
June	1,170	2,941	4,112	1,499	3,652	5,151
July	1,171	3,028	4,199	1,602	3,951	5,553
Aug	1,212	3,215	4,427	1,699	4,117	5,816
Sept	1,215	3,222	4,437	1,711	4,056	5,767
Oct				1,667	4,138	5,805
Nov				1,560	3,914	5,475
Dec				1,490	3,751	5,240

MONTHLY AVERAGES

Consumption		Consumers' Stocks†	
1951*	6,350	1951*	4,400
1950	5,740	1950	5,272
1949	4,528	1949	5,631
1948	5,414	1948	4,980
1947	5,072	1947	3,966
1946	4,124	1946	3,757
1945	4,683	1945	4,073
1944	5,112	1944	5,268
1943	5,138	1943	6,170
1942	5,022	1942	4,550
1941	4,934	1941	4,529
1940	3,711	1940	5,472
1939	3,027	1939	5,310

U. S. Bureau of Mines † End of month

Scrap Consumption by Industries

Thousands of Net Tons

	Makers of Steel Ingots and Castings[1] 1951	Makers of Steel Ingots and Castings[1] 1950	Makers of Steel Castings[2] 1951	Makers of Steel Castings[2] 1950	Iron Foundries and Misc. 1951	Iron Foundries and Misc. 1950	Total 1951	Total 1950
Jan	5,068	4,335	391	135	1,234	590	6,692	5,060
Feb	4,468	3,932	368	131	1,142	613	5,978	4,676
Mar	5,232	4,400	411	161	1,337	667	6,979	5,228
Apr	5,090	4,413	395	152	1,221	654	6,706	5,220
May	5,141	4,572	419	170	1,269	717	6,828	5,460
June	4,804	4,303	387	182	1,185	735	6,377	5,221
July	4,712	4,029	309	132	913	618	5,934	4,779
Aug	4,782	4,380	395	192	1,112	788	6,288	5,360
Sept		4,348		197		745		5,290
Oct		4,796		231		665		5,692
Nov		4,399		238		782		5,419
Dec		4,454		250		758		5,462

[1] Includes only those castings made by companies producing steel ingots.
[2] Excludes companies that produce both steel castings and steel ingots.
Beginning with 1951, more complete figures are available than for earlier periods.
U. S. Bureau of Mines

Fuel-Power-Raw Materials

METALWORKING FACTS AND FIGURES

U. S. Electricity Production Capacity

Kilowatts

1951			
Jan.	69,102,310	July	72,693,104
Feb.	69,420,743	Aug.	73,622,285
Mar.	70,250,298	Sept.	74,291,432
Apr.	70,899,622	Oct.	74,677,711
May	71,345,702	Nov.	
June	72,296,325	Dec.	

CAPACITIES AT YEAREND

1950	68,500,846	1934	34,118,741
1949	63,100,334	1933	34,586,688
1948	56,559,838	1932	34,386,739
1947	52,322,007	1931	33,698,256
1946	50,316,621	1930	32,384,363
1945	50,110,928	1929	29,839,459
1944	49,189,072	1928	27,804,576
1943	47,950,767	1927	25,079,025
1942	45,052,950	1926	23,386,194
1941	42,405,436	1925	21,472,077
1940	39,926,881	1924	17,680,743
1939	38,862,716	1923	15,642,537
1938	37,492,095	1922	14,191,922
1937	35,620,011	1921	13,518,734
1936	35,081,569	1920	12,713,608
1935	34,435,768		

Edison Electric Institute

ELECTRICITY OUTPUT

By Plants Contributing to Public Supply

Millions of Kilowatt-hours

1951—By Weeks

Jan. 6	6,602	May 5	6,560	Sept. 1	7,146
Jan. 13	6,981	May 12	6,567	Sept. 8	6,795
Jan. 20	6,909	May 19	6,559	Sept. 15	7,138
Jan. 27	6,970	May 26	6,653	Sept. 22	7,014
Feb. 3	7,099	June 2	6,445	Sept. 29	7,102
Feb. 10	6,957	June 9	6,734	Oct. 6	7,156
Feb. 17	6,905	June 16	6,747	Oct. 13	7,160
Feb. 24	6,833	June 23	6,835	Oct. 20	7,149
Mar. 3	6,822	June 30	6,898	Oct. 27	7,234
Mar. 10	6,795	July 7	6,077	Nov. 3	7,319
Mar. 17	6,903	July 14	6,739	Nov. 10	7,396
Mar. 24	6,848	July 21	6,975	Nov. 17	7,333
Mar. 31	6,767	July 28	7,005	Nov. 24	7,157
Apr. 7	6,736	Aug. 4	7,003	Dec. 1	7,476
Apr. 14	6,747	Aug. 11	7,070	Dec. 8	7,444
Apr. 21	6,730	Aug. 18	7,164	Dec. 15	7,667
Apr. 28	6,674	Aug. 25	7,077	Dec. 22	....
				Dec. 29	....

Edison Electric Institute and Federal Power Commission

YEARLY TOTALS

Millions of Kilowatt-hours

1951*	370,560
1950	328,998
1949	291,000
1948	282,698
1947	255,739
1946	223,178
1945	222,486
1944	228,189
1943	217,759
1942	185,979
1941	164,788
1940	141,837
1939	127,642

* Estimated

Fuel Oil Consumption in Steel Industry

Thousands of Gallons

	Melting Furnaces	Heating, Annealing, etc.	Total
1950	1,618,723	675,481	2,294,204
1949	1,272,367	562,930	1,835,297
1948	1,533,129	662,410	2,195,539
1947	1,511,945	655,883	2,167,828
1946	1,225,904	557,276	1,783,180
1945	1,402,527	606,130	2,008,657
1944	1,427,090	632,945	2,060,035

American Iron & Steel Institute

Industrial Coal Stocks

(Bituminous)

Thousands of Net Tons at End of Month

	1951	1950		1951	1950
Jan.	71,766	36,038	July	72,248	49,751
Feb.	68,754	24,118	Aug.	73,492	56,620
Mar.	69,813	26,893	Sept.	74,352	61,836
Apr.	70,550	36,047	Oct.	76,080	67,714
May	73,109	42,840	Nov.	....	69,389
June	75,258	49,198	Dec.	....	70,054

U. S. Bureau of Mines

Natural Gas Consumption in Steel Industry

Millions of Cubic Feet

	Melting Furnaces	Heating, Annealing	All Other	Total
1950	42,943	349,087	141,405	533,435
1949	36,589	268,444	93,852	398,885
1948	39,278	202,072	33,130	274,480
1947	34,708	195,978	24,776	255,462
1946	30,313	166,787	27,319	224,419
1945	32,613	181,042	31,235	244,890
1944	33,284	135,237	33,170	201,691

American Iron & Steel Institute

Bituminous Coal Consumption

Thousands of Net Tons

	Industrial Consumption		Retail Deliveries		Total	
	1951	1950	1951	1950	1951	1950
Jan.	36,095	30,719	10,281	11,136	46,376	41,855
Feb.	32,150	25,458	9,150	8,864	41,300	34,322
Mar.	34,345	30,008	7,320	10,025	41,665	40,033
Apr.	31,185	30,041	4,846	6,576	36,031	36,617
May	30,554	29,651	3,179	4,380	33,733	34,031
June	29,445	28,763	3,570	4,485	33,015	33,248
July	29,157	28,581	3,470	5,238	32,627	33,819
Aug.	30,802	30,836	4,934	7,118	35,736	37,954
Sept.	29,507	30,202	5,348	6,755	34,855	36,957
Oct.	32,471	32,902	6,492	5,985	38,963	38,887
Nov.		33,270		6,763	....	40,033
Dec.		35,596		9,279	....	44,875

Monthly Averages

	Industrial Consumption	Retail Deliveries	Total
1950	30,502	7,217	37,719
1949	29,530	7,525	37,055
1948	35,759	7,479	43,238
1947	37,087	8,264	45,350
1946	33,202	8,382	41,584
1945	36,331	10,150	46,482
1939	25,254	5,964	31,218

U. S. Bureau of Mines

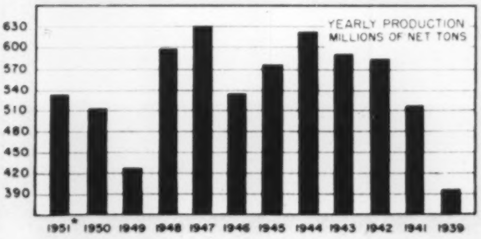
Natural Gas Sales

Millions of Therms

	Residential	Industrial, Commercial	Other	Total
1951				
1st Qtr.	5,924	7,112	297	13,333
2nd Qtr.	3,009	7,125	350	10,484
3rd Qtr.	1,257	6,988	421	8,666
4th Qtr.	....	....	...	....
1950				
1st Qtr.	4,668	6,324	267	11,259
2nd Qtr.	2,664	6,262	268	9,194
3rd Qtr.	1,141	6,236	353	7,730
4th Qtr.	3,088	6,910	318	10,316

American Gas Association

BITUMINOUS COAL OUTPUT



1951—By Weeks

Thousands of Net Tons

Jan. 6	10,025	May 5	9,710	Sept. 1	10,595
Jan. 13	11,820	May 12	9,620	Sept. 8	9,235
Jan. 20	11,175	May 19	9,655	Sept. 15	10,860
Jan. 27	11,410	May 26	9,757	Sept. 22	10,940
Feb. 3	9,415	June 2	8,710	Sept. 29	11,075
Feb. 10	8,445	June 9	9,890	Oct. 6	10,865
Feb. 17	10,685	June 16	10,340	Oct. 13	10,965
Feb. 24	10,090	June 23	11,032	Oct. 20	11,355
Mar. 3	11,145	June 30	10,517	Oct. 27	11,565
Mar. 10	10,020	July 7	1,480	Nov. 3	11,260
Mar. 17	9,920	July 14	8,440	Nov. 10	11,440
Mar. 24	10,120	July 21	10,275	Nov. 17	11,560
Mar. 31	10,190	July 28	10,270	Nov. 24	10,120
Apr. 7	9,110	Aug. 4	10,005	Dec. 1	12,145
Apr. 14	9,973	Aug. 11	10,175	Dec. 8	11,190
Apr. 21	10,630	Aug. 18	10,290	Dec. 15	11,360
Apr. 28	10,460	Aug. 25	10,747	Dec. 22	....
				Dec. 29	....

U. S. Bureau of Mines

* Estimated

Construction

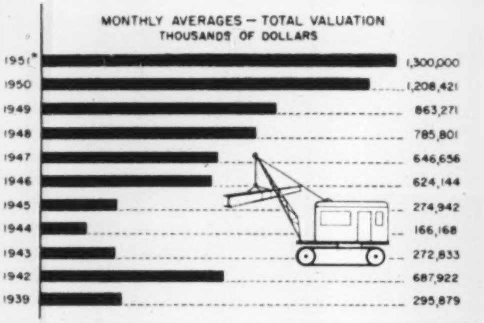
METALWORKING FACTS AND FIGURES

CONSTRUCTION VALUATION

37 States. Thousands of Dollars

	Total 1951	Total 1950	Public Works Utilities 1951	Public Works Utilities 1950	Residential and Non-residential 1951	Residential and Non-residential 1950
Jan	1 043 248	730 855	161 314	152 060	881 934	578 795
Feb	1 140 527	779 530	178 215	152 511	962 312	627 019
Mar	1 267 450	1 250 201	223 927	224 862	1 043 523	1 025 339
Apr	1 374 961	1 350 496	206 122	227 041	1 168 839	1 123 455
May	2 572 961	1 347 603	277 959	264 456	2 295 002	1 083 147
June	1 408 932	1 345 463	310 500	273 416	1 098 432	1 072 047
July	1 379 830	1 420 181	295 153	257 986	1 084 677	1 162 195
Aug	1 262 811	1 548 876	219 288	253 781	1 043 523	1 295 095
Sept	1 082 855	1 286 541	198 677	238 231	884 178	1 048 310
Oct	1 051 419	1 115 815	136 969	179 128	914 450	936 687
Nov	931 765	1 087 062	160 175	155 486	771 590	931 576
Dec		1 165 432		199 474		965 958
Total		14 501 055		2 578 432		11 922 623

F. W. Dodge Corp.

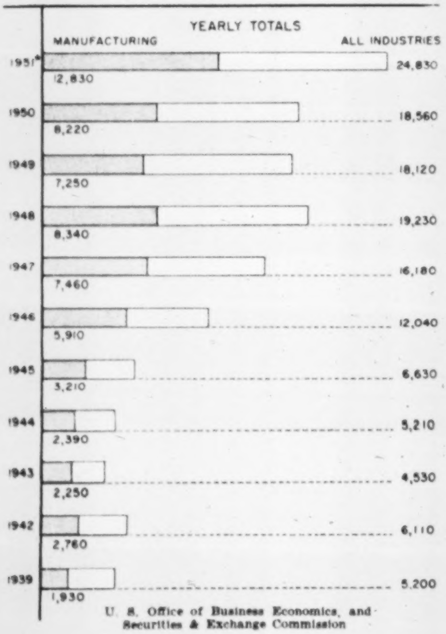


NEW PLANT AND EQUIPMENT EXPENDITURES

Millions of Dollars

(Figures are rounded and will not necessarily add to totals)

	Manufacturing 1951	Manufacturing 1950	All Industries 1951	All Industries 1950
1st Quarter	2,460	1,520	5,160	3,700
2nd Quarter	3,140	1,860	6,250	4,330
3rd Quarter	3,650	2,050	6,800	4,700
4th Quarter	3,580	2,790	6,610	5,830
Total	12,830	8,220	24,830	18,560



U. S. Office of Business Economics, and Securities & Exchange Commission

NEW HOUSES STARTED

(Permanent Nonfarm Dwellings—Cost Estimated in Thousands of Dollars)

	Number 1951	Number 1950	Cost 1951	Cost 1950
January	85,900	78,700	$755,600	$589,997
February	80,600	82,900	716,629	637,753
March	93,800	117,300	821,745	934,675
April	96,200	133,400	866,298	1,093,726
May	101,000	149,100	922,661	1,232,976
June	132,500	144,500	1,185,764	1,238,154
July	90,500	144,400	783,326	1,253,340
August	89,100	141,900	785,532	1,266,198
September	91,000	120,600	......	1,045,415
October	86,000	102,500	......	915,895
November	76,000	87,300	......	762,625
December		93,600	......	817,841
Total	1,102,500*	1,396,000	......	$11,788,595

YEARLY TOTALS

	Number	Cost		Number	Cost
1951*	1,102,500	$	1946	670,500	$3,769,767
1950	1,396,000	11,788,595	1944	141,800	495,054
1949	1,025,100	7,702,971	1941	706,100	2,825,895
1948	931,600	7,203,119	1933	93,000	285,446
1947	849,000	5,642,798			

U. S. Bureau of Labor Statistics

FABRICATED STRUCTURAL STEEL

Tons

	Orders Placed 1951	Orders Placed 1950	Orders Placed 1949	Shipments 1951	Shipments 1950	Shipments 1949
January	361,373	147,275	160,377	214,000	154,733	175,124
February	256,746	146,695	134,910	193,638	149,824	169,101
March	297,517	236,111	186,498	237,087	185,222	215,940
April	337,026	191,183	122,825	234,095	187,801	206,926
May	268,166	237,476	146,705	234,486	194,752	200,041
June	207,966	333,000	122,325	257,066	202,379	205,138
July	222,540	341,952	157,264	204,380	165,515	170,336
August	212,730	326,586	123,068	236,915	218,435	211,997
September	188,187	317,225	149,710	228,296	198,719	188,540
October	182,894	295,391	196,563	241,411	211,814	115,181
November		308,193	128,473	......	193,751	135,039
December		284,492	156,263	......	212,940	165,980
Total		3,165,579	1,784,981	......	2,275,885	2,159,343

	Orders Placed	Shipments
1948	2,432,892	2,326,574
1947	2,096,709	2,264,345

American Institute of Steel Construction

Industrial Building Cost Index

(1914=100)

	1951	1950	1949	1948	1947	1946
First Quarter	357	305	319	310	304	258
Second Quarter	373	311	313	325	300	270
Third Quarter	374	330	307	327	304	287
Fourth Quarter		339	307	323	307	300

MONTHLY AVERAGES

1951*	370	1948	321	1945	236	1942	223	1939	190
1950	321	1947	304	1944	227	1941	208	1938	191
1949	312	1946	279	1943	225	1940	193	1937	199

Aberthaw Co.

*Estimated

Continental

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Rolling Mill installations engineered complete

for steel, alloy and
non-ferrous metals

BLOOMING MILLS
STRUCTURAL MILLS
RAIL MILLS
BILLET MILLS
ROD MILLS
BAR MILLS
MERCHANT MILLS

* * *

SLABBING MILLS
UNIVERSAL MILLS
PLATE MILLS
HOT STRIP MILLS
COLD STRIP MILLS
TEMPER MILLS

* * *

Mills complete with
Auxiliary Equipment

* * *

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* * *

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from 20 to 250,000
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iron and steel
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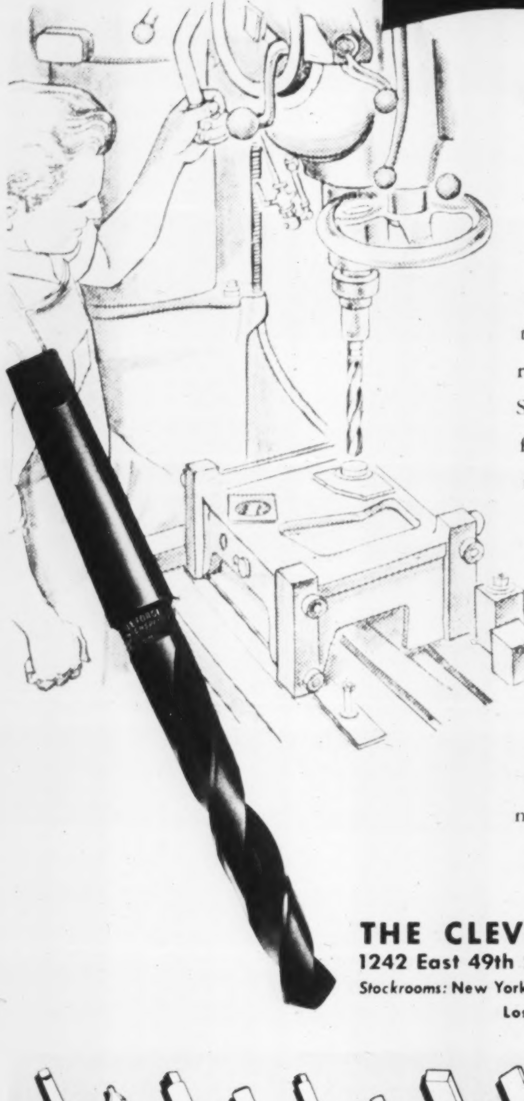

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1952
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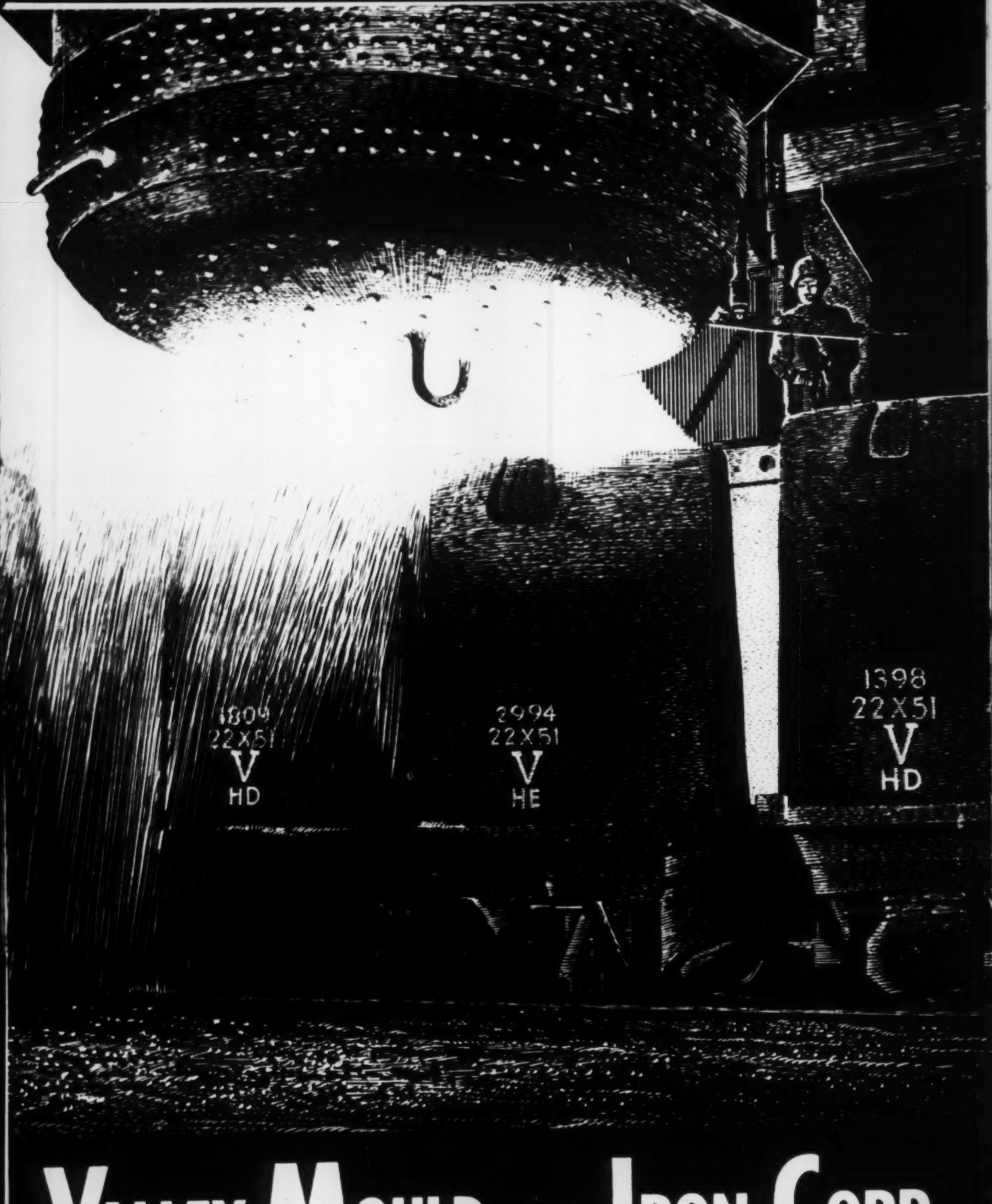

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Here's "on the job" proof of furnace savings with

B&W ALLMUL FIREBRICK

BILLET HEATING FURNACE

"ALLMUL cost half as much!"

A builder of billet heating furnaces used an expensive electrically-fused mullite refractory in the piers and baffles as well as for the arches in the discharge end of the flue. Reason? Severe operating conditions at these points. Tests of B&W Allmul proved it withstood high temperatures equally well . . . cost approximately half as much. Result? Allmul is now standard for these locations.

BUTT WELDING FURNACE

"39 weeks instead of 6 weeks!"

Semi-mullite brick bungs in the hottest part of a butt welding furnace spalled badly after six weeks. Allmul bungs in the same location were still going strong after *39 weeks*—in better condition than the semi-mullite bungs after six weeks. *Yet Allmul cost little more than the original semi-mullite refractory.* Allmul is now used in uptake arches, uptake side walls and crossovers. Customer has ordered 30 carloads to date.

CUPOLA FRONT-SLAGGER

"ALLMUL has 6 times the life plus . . ."

Replacing super-duty firebrick in a cupola front-slagger of a malleable duplexing operation three times a week was an expensive chore. B&W Allmul in the same location lasts approximately two weeks . . . *six times as long.* Costs drop, too, because of savings due to less frequent relining.

What's behind the remarkable, money-saving performance of B&W Allmul Firebrick? The answer lies in its low first cost for a fused mullite brick and unique combination of excellent refractory properties: high hot load strength, high resistance to spalling, good volume stability, a high melting point of 3335F. Bulletin R-29 gives all the facts on Allmul. Write for your copy.

BABCOCK & WILCOX

THE BABCOCK & WILCOX CO.
REFRACTORIES DIVISION
GENERAL OFFICES: 85 LIBERTY ST., NEW YORK 6, N.Y.
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R-428

B&W REFRACTORIES PRODUCTS — B&W Allmul Firebrick • B&W 80 Firebrick • B&W Junior Firebrick • B&W Insulating Firebrick B&W Refractory Castables, Plastics and Mortars • OTHER B&W PRODUCTS—**Stationary & Marine Boilers and Component Equipment . . . Chemical Recovery Units . . . Seamless & Welded Tubes . . . Pulverizers . . . Fuel Burning Equipment . . . Pressure Vessels . . . Alloy Castings**

Metals Production

● ALTHOUGH producers of steel and the nonferrous metals continue to be plagued by the shortage of raw materials made more acute by the defense buildup, there is no slowdown in technological progress, as contributors to STEEL's 1952 Forum testify.

In fact, many of the problems of tomorrow are being met with solutions today, a case in point being the plants now projected in the upper lakes region to concentrate and pelletize low grade taconites into high grade iron-bearing material for the nation's blast furnaces for generations to come.

Even so, there will still be the knotty problem of supplying an adequate tonnage of metallics to the steelmaking furnaces and foundries. For, blast furnace capacity and the visible scrap supply will not strike a balance with steelmaking capacity of 120-million tons at the end of 1952. Does it mean another blast furnace building program?

Technically, the steel industry is leaning more heavily to high top pressures for blast furnaces; continues to work on improved open-hearth and electric furnaces with the latter continuing to get bigger, now being in the 100-tons-plus range. Rolling mills are faster, higher powered. About 25 years ago tandem cold mills were rated at about 1000 hp and jogged along at four or five miles an hour. A new mill now building will have 18,000 hp and hit almost 80 mph.

Copper and brass, aluminum and magnesium producers are modernizing and expanding plants. Before too long, even magnesium will be coming off a continuous mill now under construction.

Mr. Buell:

"ONE year hence the U. S. is scheduled to have capacity to produce 120 million tons of steel ingots a year. Also, it is expected, there will be 80 million tons of blast furnace capacity, of which, historically, 90 per cent is consumed in ingot production. To produce 120 million tons of ingots will require 140 million tons of metallics. Blast furnace iron available to steelmaking will be 72 million tons. Thus, 68 million additional tons of metallics are necessary. Deducting 5 per cent for Fe in the ore charged into the open hearths, some 7 million tons, it is apparent that 61 million tons of scrap must be returned. Intraplant production of steel (home) scrap, say 25 per cent of the ingot production, amounts to 32 million tons, which makes it necessary for a similar tonnage of purchased scrap to be supplied by fabricators and scrap dealers.

"Peak year of production of steelmaking scrap for sale, 1948, saw less than 23 million tons handled. And, included were large tonnages of non-recurring European battlefield scrap and from the scrapping of ocean vessels. Where nine or more million tons of additional steel scrap is to be found poses the prime question of the steel expansion program. Strenuous efforts now being made to bring out dormant scrap may succeed in producing the scheduled 120 million tons of ingots for a short period, but it appears improbable that this rate can be supported, unless more blast-furnace capacity is projected.

"Needed blast furnace capacity is well indicated by the fact that up to about 30 years ago, blast furnace and steel ingot capacity were about equal or at a ratio of 1.0 to 1.0, while with completion of the current schedule the ratio will be 2.0 to 3.0. Further, the steel industry will attempt to support the 120-million ton capacity on dealer scrap return from steel production of the 80-million ton ingot capacity of ten or more years ago. The immediate scrap supply situation can hardly be considered unexpected. To those conversant with the industry, the end point of scrap supply has been anticipated for the past few years. Another 10 million tons of blast furnace capacity is indicated as a requisite to production of 120 million tons of steel ingots."

Mr. Jaeschke:

"BECAUSE of continued shortage of high quality cupola melting coke, pig iron and quality scrap, there has been noticeable activity in the application of preheating air equipment and furnaces for duplexing foundry cupola metal. Preheated air permits more economical use of the good cupola cokes and satisfactory temperatures from coke of less favorable quality. It affords also greater uniformity, lower sulphur iron, and greater production from the materials available now.

"Duplexing furnaces like electric furnaces or pulverized coal-fired cradle furnaces provide means for superheating or holding metal uniformly at the desired temperature. Large holding capacity of these furnaces is ideal for leveling off irregularities in analysis resulting from melting mixtures of high percentages of low-grade scrap.

"Desulphurizing forehearths and even basic lining material for cupolas are receiving more and more attention as our raw materials become worse.

"Dust suppression of cupola stack gases is becoming increasingly important because of the trend in cities to clean up the atmosphere. This trend may in time bring the cupola close to the blast furnace in design by closing off the stacks and exhausting all gases, probably through waste heat preheaters, and then through bag houses or electrical precipitators."

Mr. Ramseyer:

"GOOD progress continues in taconite concentration and pelletizing, use of oxygen in both the open hearth and blast furnace, continuous casting, and high top pressure blast furnace operation. A number of big new top charge electric furnaces are also being installed, some of which are expected to reach outputs of 30 tons per hour and more.

"Arrival of high grade iron ore from two new foreign sources in 1951 showed another way in which the steel industry is meeting the problem of the long heralded ap-

W. C. BUELL JR.

consultant, Arthur G. McKee & Co., Cleveland

W. R. JAESCHKE

consulting metallurgical engineer, Whiting Corp., Harvey, Ill.

CHARLES F. RAMSEYER

president, Ramseyer & Miller Inc., New York proaching exhaustion of our rich lake ores. Scarcity of good coking coal remains a problem and continually higher coal sulphurs appear to be in prospect for the indefinite future.

"Abroad, major interest centers in the low shaft oxygen blast furnace burdened with briquettes of mixed fine ore and coal, and the use of oxygen enriched blast in basic bessemer practice to give a low nitrogen steel of quality comparable to regular open hearth, as well as greater scrap melting capacity. In electric furnace practice new developments in soderberg type electrodes may be of interest here in view of the short supply of graphite. Successful new work has also been done abroad on the gasification of low grade fuels, while the production of metallurgical coke from non-coking coals is showing favorable results."

Mr. Davis:

"THERE is great interest in the low grade iron formation of the Lake Superior district, especially on the Mesabi where this hard rock is called 'taconite.' It exists in enormous quantities in Michigan, Wisconsin, Minnesota and Canada, but on the Mesabi—especially toward the eastern end—it is available over great areas and under shallow stripping. The iron exists as magnetite, and after crushing to a fine size (−200 mesh), it can be concentrated by magnetic separation. By agglomerating this concentrate, very high quality blast furnace ore can be produced.

"For ten years mining companies have been experimenting with the processing of taconite. Just recently, Reserve Mining Co. (Republic, Armco and National) announced plans for the first large-scale, commercial taconite operations. It has acquired the old Mesabi Iron Co. property near Babbitt, a harbor sight at Beaver Bay on Lake Superior, and the right-of-way for a connecting railroad.

"Two important new developments are drilling the blast holes by the fusion piercing process and agglomerating the final concentrate by pelletizing."

Mr. Old:

"WITHIN the past six months a blast furnace has for the first time been equipped for high top pressure in such a way as to have adequate blowing, filling and iron and slag removal capacity. As a result, the furnace, Republic Steel Corp.'s Cleveland No. 5, has broken all Republic production records, averaging 1620 tons per day.

"In addition, the furnace has set a world record by being blown at the rate of 122,000 cfm of air from its 125,000 cfm, 40 psi blower. Thus controlled pressure operation of blast furnaces is coming into its own as the method of operation of the future. As evidence, a number of steel companies are planning the use of top pressure on new furnaces and others are converting existing stacks.

"Current progress should not, however, blind us to the fact that more research is needed.

"The jet tapper now being applied so successfully to the open hearth may find use also on the blast furnace and further experiments are planned in the coming year."

Mr. Engelbaugh:

"AS we start our second half-century of steelmaking, our company finds itself faced with many new and diversified problems.

"Need for greater production and better quality is definitely recognized. Limited space, high construction costs and the necessity for lower costs make these goals somewhat difficult.

"Gradual depletion of high grade raw materials has brought problems in our blast furnaces and open hearths. Substitutes show encouraging results.

"The blooming mill at Campbell, O., was enlarged in 1951 to provide large coils from the hot strip mill. Soaking pits were added along with facilities for cold expansion of electric weld line pipe and heat treatment of seamless oil country goods.

"Adaptation of modern material handling methods shows there are very definite possibilities for increased production in this field.

"An intensive educational program, consisting of 20 hours of oral and visual instruction, was instituted during the past year. Presented to supervision, down to and including the foreman level,

E. W. DAVIS

director, mines experiment station, University of Minnesota, Minneapolis

BRUCE S. OLD

vice president, Arthur D. Little Inc., Cambridge, Mass.

H. H. ENGELBAUGH

district manager, Youngstown Sheet & Tube Co., Youngstown, O.

it is designed to acquaint the individual with the possibilities for improvements inherent in his department and provide him with the necessary tools to effect the maximum savings."

Mr. King:

"INSISTENT demand for greater steel output continues to pose many problems to operators. Additional coal washing installations, improved techniques in blending and mixing of coals, better control of bulk density, have all contributed to an improvement in uniformity of blast furnace coke with respect to physical and chemical composition. Deficits in own-produced coke are being met by installation of new batteries as well as by rehabilitation of older units.

"Improvement in coke has been accompanied by increased blast furnace output in a great number of cases. Further increases in iron output have been obtained by enlarging furnaces, installing larger blowers and associated auxiliaries.

"Lively interest is manifested in preparation of ores, in some cases by screening, supplementing the coarse ore so obtained by agglomeration of the fines. The favorable influence of rich foreign ores, even though in homeopathic amounts, has been noted in a number of cases. More furnaces are being provided with means of operating at higher than normal pressures. Studies continue in the development of more desirable refractories, including the use of carbon, high alumina brick and refractories burner at higher than normal temperatures."

Mr. Heuer:

"GREATER steel production at lower cost is resulting from increased use of suspended basic ends in open-hearth furnaces. Operating experiences are also making possible important improvements in combustion. Previously, furnace ends were kept relatively large to decrease operating temperatures and permit use of silica brick in many parts. Improved basic construction permits the ends to operate at higher temperatures without excessive attack by iron oxide and other dusts. With higher temperatures furnace ends can be reduced in size, in accordance with the original principles developed in Europe under the Maerz patents.

"Maerz furnaces are characterized by small uptakes and reverse port roofs sloping upward from the end wall instead of downward as in the so-called Venturi design. Small uptakes increase the velocity of incoming air. More efficient combustion is obtained by the high velocity gases, with better mixing of the fuel and air, higher flame temperatures and hotter preheated air. Reverse slope of the port roofs minimizes heat loss through the ports and streamlining minimizes wear which might otherwise result from high velocity gases. Small uptakes reduce consumption and cost of refractories because fewer brick will be needed to construct and repair the ends of the furnace.

"Reduced cross-sectional area of the uptakes permits the bridgewall of the furnace to be moved outward toward the end wall thereby lengthening the bath. Increased bath area effects further increased production by making the bath more shallow or increasing the furnace capacity. Many furnaces will be built in the near future following the Maerz principles."

Mr. Savage:

"DESPITE tremendous pressure on coke oven builders, the supply of metallurgical coke has not caught up with demand. Deterioration of old ovens, and the completion of new blast furnaces ahead of new ovens, makes the shortage seem inevitable for another year.

"Higher benzol prices have resulted in a better recovery of this vital chemical and production in 1951 from coke oven sources was at least 10,000,000 gallons more than expected. Incentive pricing can further increase the production of both benzol and naphthalene by making it worthwhile to recover the last hard-to-get percentages.

"Wider distribution of pipeline natural gas, and the extremely high cost of coke oven construction, has accelerated the trend towards more simplified ovens, and many of the ovens built in 1951 were modern versions of the simple rugged ovens built in World War I.

"Spray type sulphate of ammonia saturators have become

C. D. KING

chairman, operating committees, United States Steel Corp., Pittsburgh

R. P. HEUER

vice president, General Refractories Co., Philadelphia

PHILIP S. SAVAGE

vice president, Donner-Hanna Coke Corp., Buffalo

MORGAN
CAPACITY 20000 LBS.

10-TON, 29′-1½″ SPAN
O. H. FLOOR CHARGER

BUILT BY MORGAN Engineering

DESIGNERS • MANUFACTURERS • CONTRACTORS
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ELECTRIC WELDED FABRICATION • LADLE CRANES
STEAM HAMMERS • STEAM HYDRAULIC FORGING PRESSES
SPECIAL MACHINERY FOR STEEL MILLS

THE MORGAN ENGINEERING CO.
ALLIANCE, OHIO PITTSBURGH—1420 OLIVER BUILDING

Illustrated is a Morgan 10-Ton High Visibility Floor Charger with hydraulic hoist and box clamp.

By using a hydraulic hoist, the large hoist motor with its reduction unit usually used, is eliminated, thus providing maximum visibility for the operator.

A hydraulically operated head at end of peel clamps the box head so the box will not "flop around" when turned.

Four (4) take-up reels for handling the motor leads are provided, thus eliminating twenty (20) conductor angles on the bridge.

Trolley is carried on four (4) top running wheels with two (2) kick-up wheels. The two rear upper and kick-up wheels are spring suspended for absorbing shocks when picking up loaded boxes.

PROGRESS REPORT ON NATIONAL CARBON BLAST FURNACE LININGS

TRADE-MARK

33 BLAST FURNACES lined with "NATIONAL" carbon have now produced over 1 million tons. Of these, 12 furnaces have produced more than 1½ million tons and 4 have passed the 2 million ton mark.

These tonnages are for *original linings.* In every case, production has been characterized by remarkably trouble-free operation.

IS MY FACE RED! NO MATTER WHAT I DO, I CAN'T MELT THIS STUFF!
HY NEET
NATIONAL TRADE-MARK CARBON

The term "National" is a registered trade-mark of Union Carbide and Carbon Corporation

NATIONAL CARBON COMPANY
A Division of Union Carbide and Carbon Corporation
30 East 42nd Street, New York 17, N. Y.
District Sales Offices: Atlanta, Chicago, Dallas, Kansas City, New York, Pittsburgh, San Francisco
In Canada: National Carbon Limited, Montreal, Toronto, Winnipeg

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BLAST FURNACE LININGS • BRICK • CINDER NOTCH LINERS • CINDER NOTCH PLUGS • SKIMMER BLOCKS • SPLASH PLATES • RUNOUT TROUGH LINERS • MOLD PLUGS • TANK HEATERS

standard, and spray type benzol scrubbers are gaining favor.

"High cost of chemical type ovens, and the relatively low prices of coal chemicals in relation to the cost of ovens and coal, have made it economically possible to build wasteful beehive ovens."

Mr. Reinartz:

"I would like to stress, particularly, one trend in steelmaking. A number of large electric melting furnaces, tapping over 100 tons per heat, are now in operation. Some are equipped for top charging scrap. These furnaces use very high current input.

"Even larger furnaces, with higher power requirements, are contemplated. These large furnaces, using all cold scrap, compare quite favorably in tons per hour production with modern open-hearth furnaces. Due to present high cost of scrap and power, cost of producing ingots in electric furnaces in integrated plants is considerably higher than in open-hearths. In isolated areas, where coke and iron ore are short, such furnaces can compete well.

"Experiments are proceeding in a number of integrated plants using hot metal in the electric furnace charge. Percentages of hot metal, comparable to those in open hearths, have been successfully charged.

"To reduce electric furnace costs and to decrease contamination of nonferrous metals existing in increasing percentages in present-day scrap iron, it will be essential for best results, to develop a good hot metal charge practice in large electric furnaces.

"Production of ingots in large open-hearths is proving economical, from a cost standpoint, and no insurmountable quality difficulties have been encountered. The new scrap iron charging innovation employed by one steel company, after a year's operation, is working out quite satisfactorily."

Mr. Kurzinsky:

"NEW strides were made during 1951 in the application of oxy-natural gas flames to maintain hot-top metal in a fluid state during ingot solidification. This process makes it possible to reduce by up to 50 per cent the hot-top volume normally carried.

"Linde recently introduced an original heating unit which eliminates the necessity for water-cooling. Previously, the heating equipment required water-cooling to assure adequate life in service. In production studies, several disadvantages became apparent when water-cooled apparatus was utilized. Increased equipment costs, manifold systems to convey the coolant to and from the heating equipment, the necessity for anti-freeze solutions during winter operations, and the inherent hazard of water near hot steel were the disadvantages cited by the steel mills. Production experience has proved the desirability of the present non-water-cooled equipment.

"This process is finding its principal application on high alloy and stainless steel ingots where the increase in yield easily justifies the cost of this supplementary heating."

Mr. deCoriolis:

"APPLICATIONS of the venturi type jet pump, to steel mill one-way fired soaking pits, has provided substantial proof that resulting improved recuperative action reduces fuel costs and maintenance, and considerably improves overall operation of these pits. This increase in efficiency is due primarily to the jet pump's ability to deliver preheated combustion air to the burners at higher temperatures and pressures than previously attainable.

"The jet pump system utilizes the venturi principle to draw air through a refractory recuperator and force it through the manifold piping and burner equipment. Motive power for the pump results from compression of a small quantity of cold air, in a standard cold blower, preheating this air in a metallic recuperator and delivering it to the jet venturi through an adjustable needle valve. Regulation of the valve controls the rate of air expansion and maintains required combustion air pressure in the main distribution header.

"Maximum available temperature of the combustion air is utilized and any resulting changes in air density, due to temperature variations, are compensated for by an automatic device that maintains cor-

L. F. REINARTZ

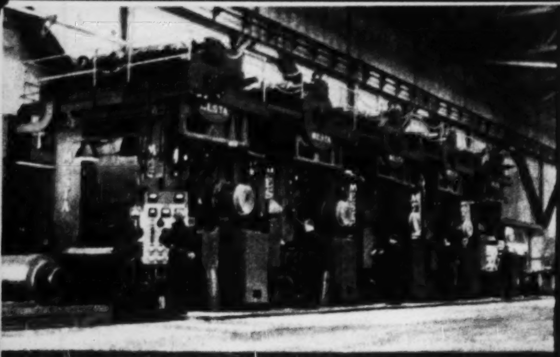
ass't. vice president of operations, Armco Steel Corp., Middletown, O.

E. F. KURZINSKI

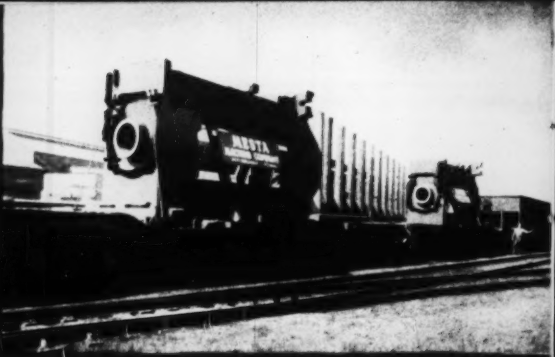
development engineer, Linde Air Products Co., New York

E. G. deCORIOLIS

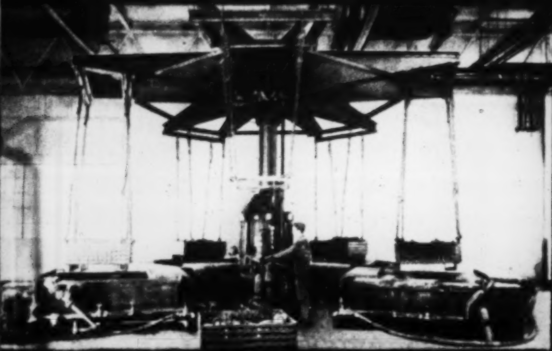
director of research, Surface Combustion Corp., Toledo, O.



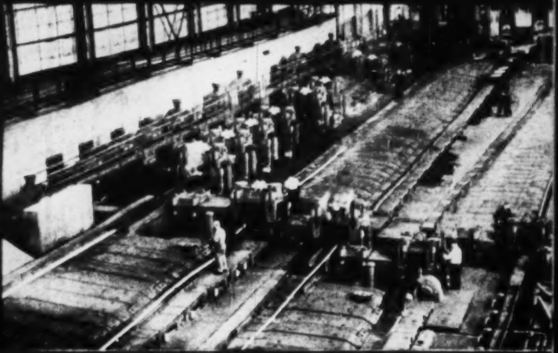
MESTA 56" FOUR-HIGH, FIVE-STAND TANDEM HIGH-SPEED COLD MILL



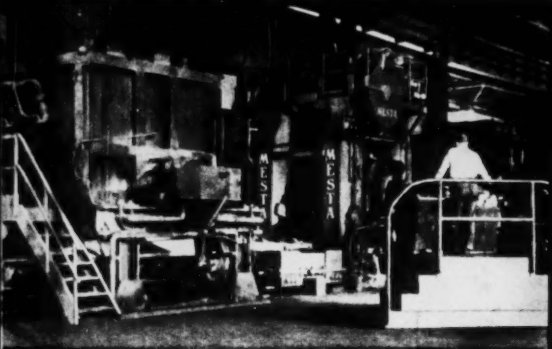
PAIR OF MESTA HOUSINGS FOR COLD ROLLING MILL LOADED FOR SHIPMEN



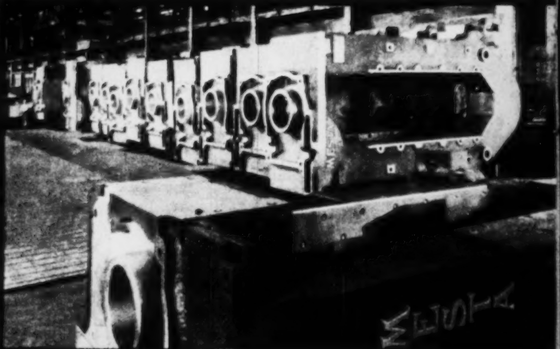
MESTA 32" PATENTED PICKLING MACHINE



MESTA MERCHANT MILL WITH PACK ANNEALING COOLING BED AND EQUIPMENT

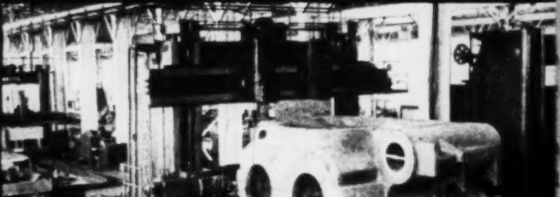


MESTA 42" FOUR-HIGH REVERSING HOT STRIP MILL



GROUP OF MESTA ROLLING MILL HOUSINGS ON ERECTING FLOOR

MASSIVE GENERATOR ROTOR SHAFT FORGED FROM INGOT POURED
IN THE MESTA OPEN HEARTH DEPARTMENT



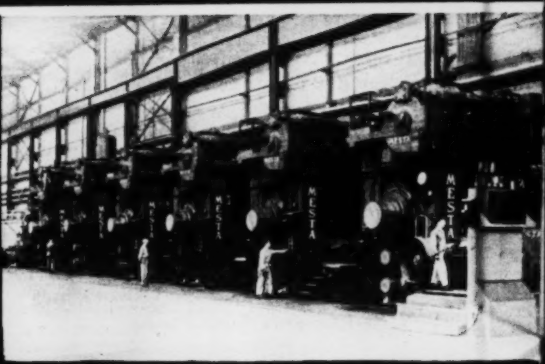
MACHINING CAST STEEL CAP FOR LARGE HYDRAULIC PRESS
ON A MESTA HEAVY DUTY PLANER

Designed and Built By

MESTA

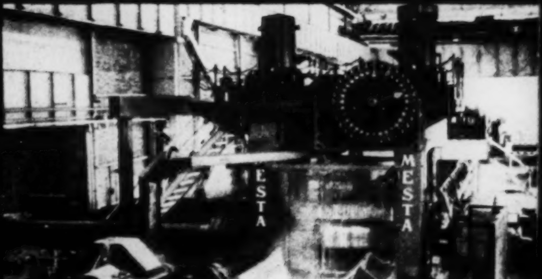
MACHINE COMPANY
PITTSBURGH, PA.

MESTA 18,000 TON HYDRAULIC DIE-FORGING PRESS



MESTA 68" FOUR-HIGH CONTINUOUS HOT STRIP MILL FINISHING STANDS

MESTA-THOMSON FLASH WELDER INSTALLED IN
A MESTA HIGH-SPEED CONTINUOUS PICKLING LINE



MESTA 46" TWO-HIGH REVERSING SLABBING-BLOOMING MILL
WITH MANIPULATORS AND TABLES

rect air-fuel ratios at all times. Air velocities in the venturi throat often reach 100 mph and in the jet diffuser chamber are in the range of 600 mph.

"The jet pump system is designed to salvage, through recuperative action, the greatest amount of heat energy from the flue gas."

Mr Farnsworth:

"IN recent electric furnace installations, trend is toward heavier construction, larger shell diameter, increased transformer rating, and top charging—all of which contribute to higher furnace production and improved economics.

"Top charging has been in use on small furnaces for many years, but only in the last several years has the swing-aside roof been employed on furnaces of 18-foot shell diameter and larger. For charging scrap, large drop bottom buckets of over 1000 cubic foot capacity are in use.

"Furnaces of 20-foot shell diameter, powered with 25,000 kva transformers, are now in service. Next step is 22 foot shell diameter furnaces with 35,000 kva transformers planned to go into production shortly.

"Important improvements include rotating controls for accurate regulation of the arc and automatic power factor regulators for optimum current efficiency. Automatic electrode clamps now in use save time and eliminate much disagreeable work on top of the furnace. Further improvements are in progress, and it is felt that the practical limit in furnace size and transformer capacity has not yet been reached."

Mr. Holub:

"PRIMARY conditioning of stainless steel slabs by powder-scarfing is continually increasing. Technological advances made in this process during 1950 are being further advanced today and conditioning costs are being reduced by increasing operator know-how. In addition, although it was first considered that mechanization of the process was necessary for best results, today hand operations are proving completely satisfactory. So effective are hand operations that one of the country's largest stainless steel producers is hand-scarfing over 50 per cent of their stainless steel slab production in one plant. Slabs for sheet, coil, and plate material are being scarfed in one-sixth the time, and at approximately one-half the cost of mechanical grinding."

Mr. Parker:

"AGAIN faced with 'extended' delivery dates on some steel products, and government denial of delivery on others, particularly those containing strategic or critical alloying elements, it would be wise for metallurgists and engineers thoroughly to review their material requirements most critically. Every effort should be made to use standard compositions, sizes, lengths, etc. in a minimum number of variations.

"Simplification of consumer requirements will permit more flexible use of steelmaking raw materials and steel mill equipment thus assisting in increased production and availability of steel mill products. In the consumer's plant simplification of requirements will improve housekeeping, reduce errors, reduce inventories and minimize paper work."

Mr. Cashin:

"OUTSTANDING factor in the refractories industry during 1951, was the high demand for products brought about by high steel production and the expansion program in the steel industry. Fortunately, we had expanded our periclase facilities at Moss Landing, Calif., late in 1950, so that we went into 1951 with sufficient raw materials to satisfy the unusual demands. During 1951, we expanded our brick-making capacity and added a tunnel kiln to supplement burning capacity. We are moving ahead on further expansion to keep pace with the increased demands for brick and prepared mixes.

"An important development in the steel industry is the further acceptance of high MgO periclase ramming materials. During the year, numerous open hearth bottoms were installed and records kept have shown a definite increase in steel tonnage produced, brought

W. M. FARNSWORTH

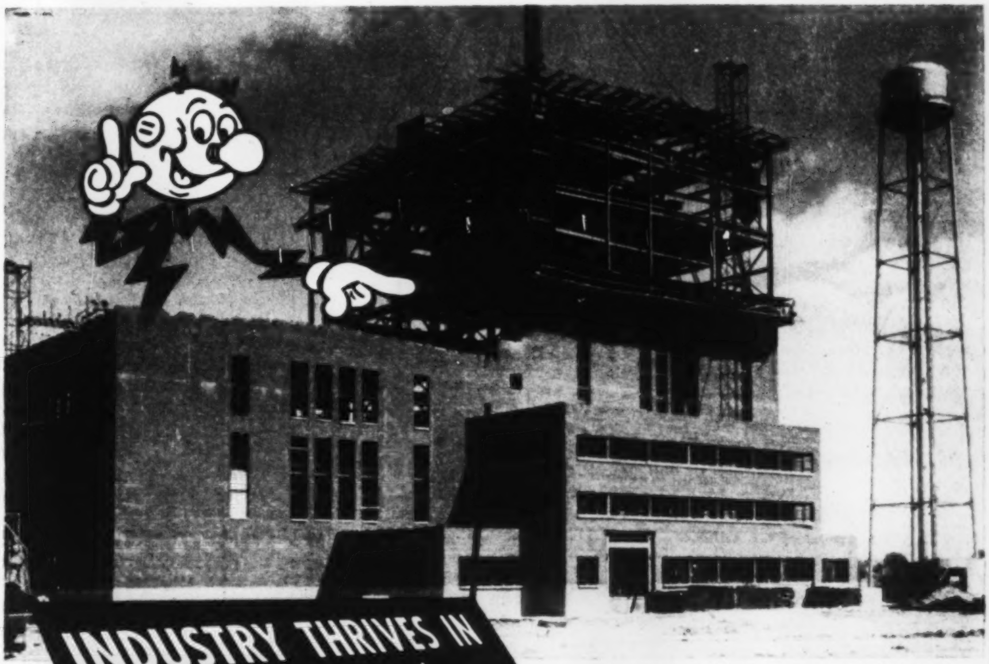
assistant district manager, Republic Steel Corp., Massillon, O.

E. M. HOLUB

development engineer, Linde Air Products Co., New York

CHARLES M. PARKER

secretary, committee on mfg. problems American Iron & Steel Institute



INDUSTRY THRIVES IN Outstate Michigan

The new Justin R. Whiting power plant on Lake Erie, at the southeastern boundary of Outstate Michigan, will go into service in 1952.

THE ELECTRIC INDUSTRY PROVES IT!

SINCE VJ Day Consumers Power Company, which serves fast-growing Outstate Michigan, has increased its electric generating capacity 410,000 kilowatts, or 64%. Another 411,000 kilowatts are scheduled to be added before the end of 1954, bringing total generating capacity close to 1,500,000 kilowatts.

Why this tremendous expansion?

Industry thrives in Outstate Michigan and population has grown rapidly. Thriving industry and a growing population mean a greater demand for electric power.

The automobile industry, the furniture industry, the packaged food industry, the chemical industry, the paper industry, the fabricated metals industry and countless others thrive in Outstate Michigan.

Farming thrives in Outstate Michigan too, and this is one of America's most popular vacationlands, but the big reason for the growth of the electric industry in Outstate Michigan lies in the steady growth and prosperity of the manufacturing industries.

If you are looking for a location for a factory, don't overlook Outstate Michigan. Here you will find skilled manpower, materials and markets, an ideal climate, wonderful living conditions.

May we tell you more about Outstate Michigan? A telephone call, a letter, a telegram will put us at your service.

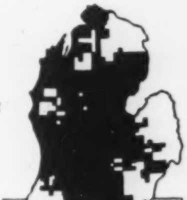
Check These Advantages of Outstate Michigan

★ **Exceptionally High Percentage of Skilled Workers** ★ **In the Great Market Center of America**

★ **Wide Range of Materials, Parts and Supplies** ★ **Diversified Industries** ★ **No State Income Tax**

★ **Desirable Plant Sites** ★ **Dependable Electric and Gas Service at Low Rates**

★ **Excellent Living Conditions and Cultural Opportunities** ★ **A Foremost Vacation Area**



Black area on map shows territory served by Consumers Power Company

N-24-BW

FOR MORE INFORMATION CONTACT Industrial Development Department
CONSUMERS POWER COMPANY JACKSON, MICHIGAN

about by less delay time and time saved in installation. To confirm further the excellent results obtained with these products, installations are being made in numerous new open hearth shops where the operators feel that by putting in place the highest amount of MgO per cubic foot, they will obtain the best bottom life and gain all important tonnages. Furnaces are being pushed as much as possible and new production records are being made partially due to the development of refractories to withstand higher temperatures and other operating conditions."

Mr. Walther:

"TREND to even larger, higher powered electric furnaces continues. This results from unprecedented steel demand and the academic thinking that with a well-planned plant layout, the electric process could compete economically with the open hearth in carbon and simple alloy steels. The latter premise depends to a large extent on available scrap supply in a given plant location.

"A most interesting development is the decision of the Timken Roller Bearing Co. to replace its three present open-hearth furnaces with three top charge, 20-feet diameter arc furnaces designed to accommodate inductive stirrers. By this method, the slag-metal relationship will be more intimate thermal stratification and segregation of the molten bath will be avoided. It is apparent that accomplishing these objectives will permit the production of a more closely controlled, high quality product.

"This method combines the best features of both induction and arc melting and was developed in two small furnaces in Sweden. The application to large tonnage furnaces is a bold step forward in the United States and could lead to wholly steel."
new concepts of quality alloy

Mr. Harris:

"INCREASE in speed and power of modern mill and processing line drives are significant developments. Classic example is the tandem cold reduction mill. The first tandem mill was installed in 1928 with a maximum speed of 340 fpm and a total horsepower on all stands of 1020. By 1938 the speed had risen to 2500 fpm and the horsepower to 6500. The high speed five-stand tandem tinplate mill of today will have a top speed of from 4500 to 6500 fpm and a total connected horsepower of 18,000.

"Problem of motor and control co-ordination has increased considerably as the speed has increased. The low speeds required for threading, welding, and changes from one reel to another, have remained practically the same even with the increase in top speed. This means that the drive must operate successfully over a much wider speed range. The problem of acceleration and deceleration over these wide speed ranges means closer co-ordination and more engineering work to achieve a good balance between drive components. These criteria have increased the use of equipment such as edge regulators, and the speed, voltage, and tension regulators needed for more precise control."

Mr. Seaver:

"DEVELOPMENT and improvements to the electric furnace are making such rapid advancements that several units of over 100 tons capacity are now under construction or projected.

"Open-hearth furnaces have not been changed to increase their efficiency much for a period of years. Although units with capacities up to 500 tons have been built, nevertheless, the fuel consumption per ton and the production of steel per square foot of hearth area have not been much improved.

"If the open-hearth is to maintain its percentage of total steel production, it must be recognized that fundamental improvements, now available, must be made.

"Combusted gases must be cleaned, so that it is possible to use smaller checker openings with greatly increased heating surface in the present sized regenerators, to give high heat recovery. Multiple individual fuel burners, which permit flexible control, must be used to burn more fuel with complete combustion in shorter periods.

"All-basic furnace roofs have not proven to be economical and semi-basic roofs have to be changed to a design which will

HARRY F. WALTHER

supt. of melting, steel & tube div., Timken Roller Bearing Co., Canton, O.

W. R. HARRIS

mgr., industry engrg. dept., Westinghouse Electric Corp., E. Pittsburgh

J. J. SEAVER

manager, J. J. Seaver Engineers, Chicago

McKAY

WALKER BROTHERS, of CONSHOHOCKEN, PA., have earned their reputation as manufacturers of quality conduit and electrical raceway tubing through years of serving the electrical industry. To maintain this position, it requires constant and rigid inspection—an alertness to new methods and the use of quality equipment.

McKAY is proud to have had their tube mills selected by WALKER. Experience gained after producing millions of feet of conduit on McKay tube mills, has proven conclusively that they can rely on McKay equipment to maintain their high standard of quality and keep pace with the ever increasing volume demanded by industry.

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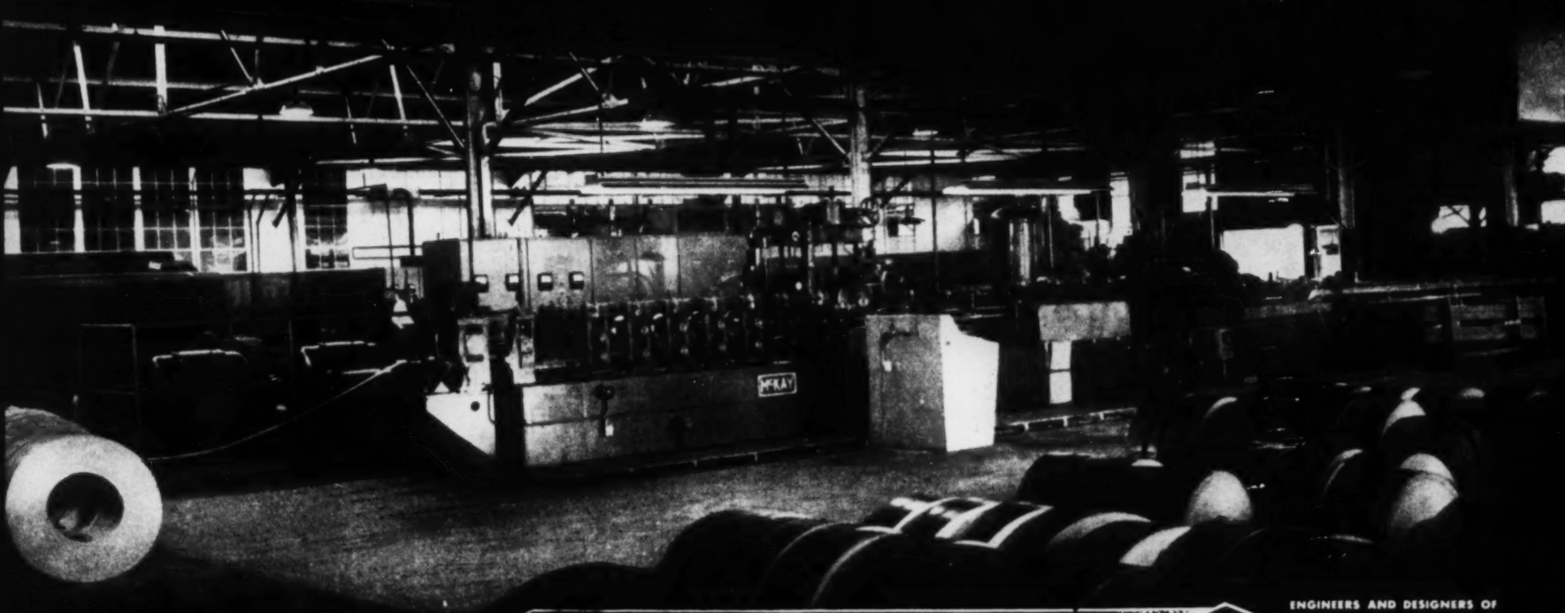

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ENGINEERS AND DESIGNERS OF
EQUIPMENT FOR THE AUTOMOTIVE,
FABRICATING AND STEEL INDUSTRIE

ASSOCIATED WITH WEAN ENGINEERING CO., INC permit the silica and basic brick to expand and contract independently of each other, without any tension on the basic brick."

Mr. Luerssen:

"**MANY** of the newer highly alloyed stainless and temperature resisting steels and alloys present difficulties in forging due to lack of inherent malleability. Red-shortness causes inordinate losses in hot working from ingots into the bar or billet form, resulting in loss of both production and part of the strategic alloy involved. It also is the means of slowing production of finished parts when these must be produced by forging. Hence, improvement in hot working properties of such alloys is of extreme importance.

"Such improvement has been found possible by the addition, during the melting operation, of suitable amounts of the rare-earth element, cerium, or cerium and lathanum. Greatest improvement has been experienced in the austenitic stainless steels such as types 309, 310, 316, 317 and 330. Particularly have those in which the nickel content exceeds the chromium content been benefitted, and in some such cases alloys which were formerly virtually nonforgeable have been converted into forgeable alloys by the addition of 0.60 per cent cerium. A considerable quantity of such alloys has been produced with success.

"While not yet thoroughly explored, addition of cerium will also probably assist in the forging of some of the so-called super alloys which are notoriously difficult to hot work. It is reasonable to believe that part of the advantage of the use of cerium lies in the fact that it permits higher forging temperatures without redshortness, and consequently might result in easier and faster hot working."

Mr. Poole:

"**NOT** only was 1951 a record year for volume of electrical sales to the steel industry, but it also brought about new technical contributions by the electrical industry. World's fastest steel rolling mill, a 5-stand tandem tin plate mill, was shipped to one of the major steel companies. Top speed will be approximately 80 mph and it will utilize combinations of equipment not previously furnished. One is use of six 1000-hp d-c motor armatures connected to the work rolls on the fifth and final stand to provide triple armature twin drive. This novel combination was made necessary by the large amount of power, the high speed and the space available for mounting the motors.

"Also, during 1951 electrification of Jones & Laughlin's famous blooming mill at Aliquippa was started. New 12,000-hp twin reversing motors will replace the 40-year old steam engine. Unusual design of twin drive motors, main generators and excitation system is expected to make this the fastest reversing drive ever built.

"These contributions are to a great extent made possible by relatively new methods of analysis for regulating circuits."

Mr. Hutchins:

"**MEASURING** width of hot-strip in a hot mill has always been complicated by the high temperatures (above 1500°F) of the strip. The width gage, instead of operating in spite of the heat, operates because of it. Edges of the hot strip are imaged on two detectors mounted 15 feet above the steel, and two phototube scanners generate signals to compare the actual width with the desired width. It can be used on strip from 10 to 96 inches wide and at any temperature (artificial lighting of the strip is required when the temperature is less than 1500°F).

"In the mill, the operator sets the indicator on the control panel to the width being run, and the detectors locate themselves correctly. An indicator on the panel shows deviation from desired width up to one inch. Measurements are accurate within 1/8-inch even though the strip may shift back and forth as much as three inches on each side of the normal position.

"Mounted after the last roughing stand, the gage will indicate to the operator what adjustments are needed on the edging rolls to give the desired width. If the gage is installed at the last finishing stand, it may give indications which the operator can use to interpret the effect of tension on

GEORGE V. LUERSSEN

v.p., Carpenter Steel Co., Reading, Pa.

H. W. POOLE

manager, steel mill div., General Electric Co., Schenectady, N. Y.

W. C. HUTCHINS

mgr., special products div., General Electric Co., Schenectady, N. Y.

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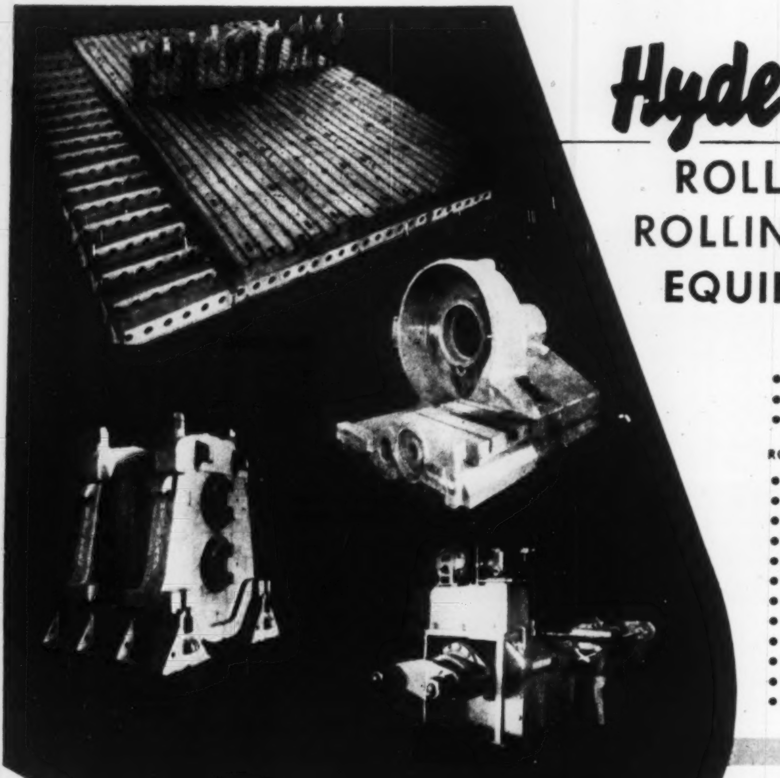

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width and enable him to adjust tension to the proper value. First width gage will soon be installed."

Mr. Fisher:

"ESTABLISHED use of wear-resistant carbide wire drawing dies has led to an industry-wide search for an effective substitute for the conventional wet process of acid pickling of steel wire rods in recent years. Two different mechanical descaling processes have been embodied in operative equipment, installed and tested this year.

"One process—shot blasting—has been adapted by an American builder of shot blast machinery. By this method one or more strands of hot rolled or patented steel rods are pulled through a shot blasting chamber and thoroughly descaled. The resultant surface is clean and finely etched and therefore suitable for immediate cold drawing under dry soap lubrication.

"The other process—roll bending and brushing—has been incorporated in a French machine which breaks the scale by reverse bending over idler rolls prior to effective wire brushing. This machine is quite compact and can be positioned within a few feet of the entry die box of a continuous wire drawing machine. The hot rolled rod is pulled from the pay-off flipper in single strand through the descaler and through the first die by the rotary traction of the first wire drawing capstan. The descaled rod surface can be suitably lubricated with dry soap powders to avoid abnormal die wear."

EDWARD J. P. FISHER
consulting engineer
N. Jackson, O.

"Equipment for automatic tumbling, weighing and packaging of wire nails receives the rough nails from the nail machines; tumbles them to remove 'whiskers' and to polish; then weighs and delivers the finished nails into successive open kegs.

"Several nail mills are testing the feasibility of packaging wire nails in square paper-board boxes instead of the conventional round woden nail keg. If the American market could be persuaded to accept this substitution, both the producers and the distributors would benefit through easier handling and more compact storage of the new containers."

Mr. Bloxdorf:

"SULPHURIC acid pickling for removal of heat treating scale has long been accepted in surface preparation prior to cold drawing of carbon steel wire. Shortage of acid and increasing governmental pressure in disposing of spent pickle liquors have resulted in consideration of methods designed to eliminate acid in normal operations.

"Most promising is the use of scale breakers incorporating rolls and blasting of either the mechanical or air type. Experiments have been conducted and many are in progress employing these methods in conjunction with the application of suitable coatings designed to facilitate final cold drawing. Indications are that it will not be too long before it will be practicable to cold draw many types of wire without conventional acid pickling. However, much remains to be done before obtaining complete elimination of acid in wire mill operations.

"The coating applied to the wire from which the scale has been mechanically removed is of extreme importance as is the proper lubricant in the final cold drawing operation.

"Elimination of acid pickling in the wire industry is a goal certainly worth striving for. The tremendous saving in metal alone would be worth all the effort now being put forth."

W. R. BLOXDORF, metallurgist, Macwhyte Co., Kenosha, Wis.

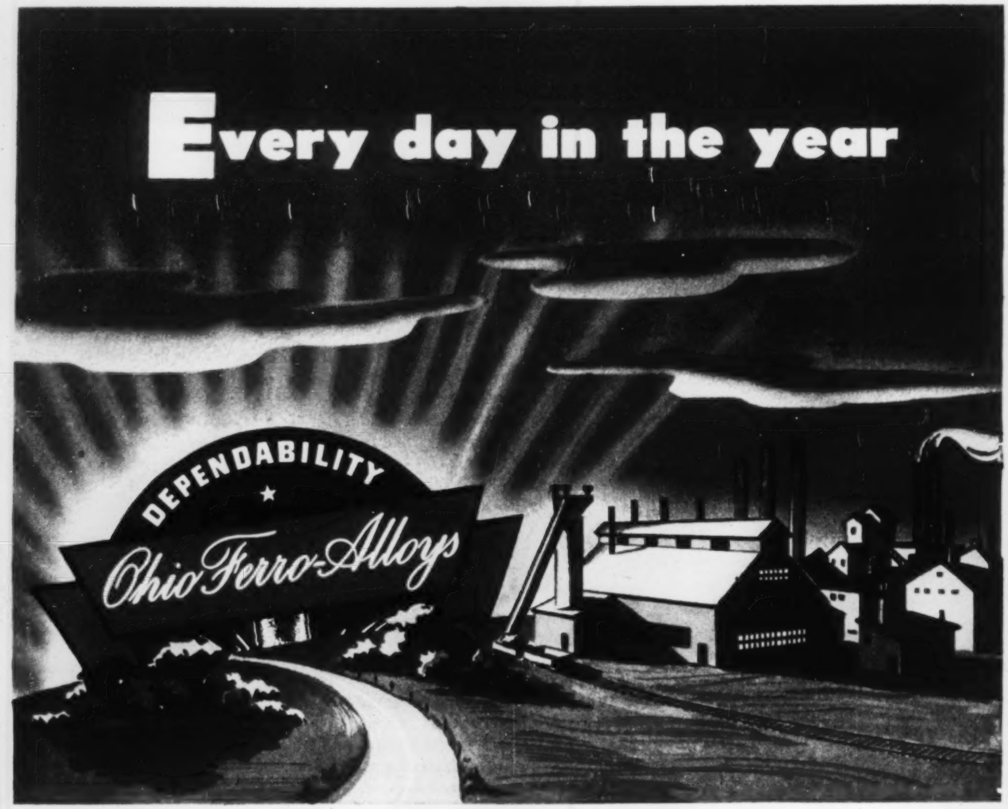
Mr. Keller:

"A DEVELOPMENT just beginning to make itself felt, but which shows indications of rapid growth, is the use of lubricants other than oils to reduce friction in the plastic working of metals. These may be considered to be protective coatings, or lubricants, or both. For example, in the hot extrusion of steel, a layer of molten glass is being used between the hot steel and the die; the glass acts as a heat insulator as well as a lubricant.

"In the cold drawing of steel, phosphate coatings which were used experimentally in 1943 in the deep drawing of steel cartridge cases, and were found quite effective in reducing friction, have been reintroduced for more general use, with a more rapid coating process. Possibly, such coatings could also be used in cold-reducing steel strip, to permit greater percentage reductions per pass.

"Other developments are the use of tungsten carbide work-rolls in the finishing stands of cold-reducing mills (possibly also, chromium carbide, if the modulus of elasticity of this brand-new material proves high enough), and the use of hollow back-up rolls; however, it is as yet too early to warrant any prediction as to how successful these may prove."

J. D. KELLER
partner, Associated Engineers,
Pittsburgh



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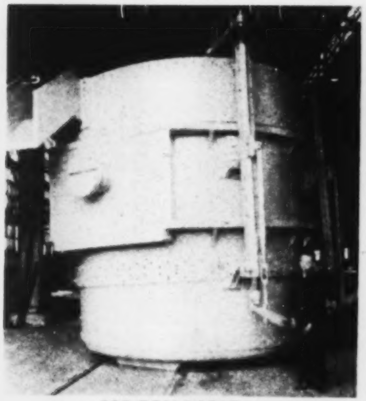

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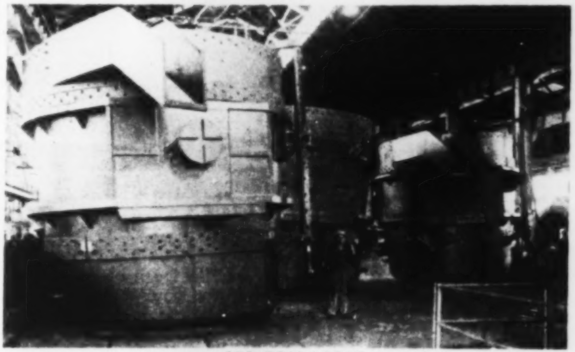

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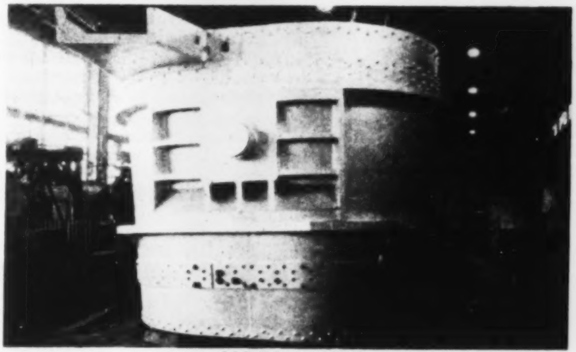

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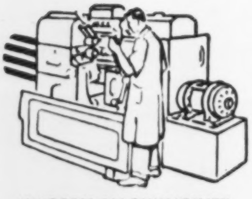

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Materials & Components

● WITH MOST metals on the critical shortage list, the search is on for suitable substitutes and replacements. This search in itself creates new scarcities and the problem resolves itself into one of overall conservation requiring the diligent application of intelligent materials engineering.

For instance, present high temperature alloys for jet engines take large quantities of scarce nickel, cobalt, tungsten, molybdenum and columbium. But, in borrowing some thinking from the British, we find it possible to use lower alloy materials by designing parts for a given life expectancy—say a thousand hours.

And, largely inspired by the automobile industry, there is a greater tendency to save alloys by specifying steels adequate for a given application without allowing for an unnecessary amount of extra leeway for physical requirements. Closer attention to heat treatment, of course, is aiding in this alloy, money-saving movement.

Many of the NE steels are being carried over from the last war and further attention is being given to the use of boron as a replacement for alloys in conferring hardenability on steels.

With Uncle Sam as No. 1 customer and capacity heading toward 5000 tons a year, titanium is assuming a place beside other major metals. It sells for $5 a pound but so did aluminum in its early days.

Mr. Townsend:

"METAL scarcity problems will continue into the indefinite future. Scarcity of metals has caused careful studies to be undertaken to develop substitutes and replacements. This activity, in turn, has produced new scarcity. The best approach to this problem is by the route of conservation.

"Each metal has unique characteristics. The best utilization of each of these metals then would be along the line of exploiting its particular unique characteristics. This brings to the fore the important interplay between metals. For example, if one needs a strong metal of fair conductivity and resistant to corrosion, he can use bronze, or better copper clad steel wire, steel providing the strength and copper conductivity and corrosion resistance. Cladding, sandwich construction, inlay and overlay are rapidly coming into use.

"This situation indicates the need for more intensive materials engineering. The composite structures must be reviewed from the point of reliability of the process and these composite structures will require complete revision of our notions concerning stressing and structural mechanics. A new field of fatigue testing and corrosion couples is involved.

"Another example of the use of composite materials is the introduction of alpeth cable in the telephone plant. Here a thin layer of aluminum under a polyethylene extruded sheath provides the moisture barrier and the polyethylene provides the mechanical strength, creep and fatigue resistance and resistance to atmospheric attack. Composite construction of aluminum and polyethylene replaces lead formerly used for cable sheathing.

"Joint employment of metals, adhesives, plastics, combined by fairly elaborate processing methods is an important trend."

Mr. Davison:

"STOCKPILING for National Defense, plus the requirements for direct military and essential civilian applications, have been taking such a large percentage of the total production of special high grade zinc that all requirements could not be met. Similar situations have been too familiar to users of both ferrous and nonferrous metals to need further amplification.

"Barring major changes in the Controlled Materials Plan as it stands at present, the supply of special high grade zinc should be sufficient to meet all military and essential civilian needs. Military needs never have lacked the zinc they required, and the cutbacks in the production of consumer durables called for by CMP will lessen the demand for zinc in civilian applications."

Mr. Manuele:

"FEEDING, clothing, housing, and arming two-thirds of the world has brought the USA face-to-face with an uncomfortable realization its resources are rapidly disappearing. Temporary solution is substitution. But a program of substitution merely creates a shortage tomorrow of a material which is only in limited supply today. It does not solve the shortage problem permanently.

"Steel is used for aluminum; aluminum is used in place of copper; cobalt is used in place of tungsten. But none of these substitute materials are available in unlimited quantities, nor can supplies be increased indefinitely. Therefore, the problem facing the engineer is to find sources of raw materials which are widely distributed in nature, which can be converted, or made available at reasonable costs, and which have the chemical and physical properties required.

"Thermosetting plastics fall in this category. The base for most of these is wood flour. For added strength macerated cotton fibers, or cloth can be used. Glass fibers, when molded, have tremendous impact resistance, and tensile strength. Both cotton and glass are in abundant supply. But asbestos is not, and it should not be considered seriously as a substitute for already scarce materials.

"Thermosetting plastics are a versatile group of materials and they can be adapted to a variety of uses such as supports for assemblies, coverings or housings for apparatus, cores, and applications too numerous to mention. When properly cured, they are reasonably stable, not affected by heat, moisture, or chemicals. They are available in a variety of colors thus

J. R. TOWNSEND

materials standards engr., Bell Telephone Laboratories Inc., New York

R. DAVISON

manager, market development div., New Jersey Zinc Co., New York

JOSEPH MANUELE

director, quality control dept., Westinghouse Electric, E. Pittsburgh

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Gun Iron is produced in air furnaces similar to steel open hearth furnaces and has a dense, close-grained, 100% pearlite micro-structure with an even distribution of flake graphite throughout. It also has exceptional resistance to high heat, impact, corrosion and erosion and damps vibration more effectively than other irons. Our engineers and metallurgists are at your disposal to discuss the application of Gun Iron to your strategic cast parts . . . our furnaces, foundry and extensive machining facilities stand ready to produce them accurately and economically. Why not write for more details today?

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eliminating the problem of finishing, plating, and painting."

Mr. Potter:

OUR problems during 1951, with the demand for increased production, center mainly in overcoming shortages of rolled steel, steel castings, drives, controls and labor. Steel rounds and heavy section pipe are especially in short supply.

We have to use considerable NE and TS substitutes for SAE Steels. We form some light structural shapes on our press brakes. Because of nickel shortage, we are campaigning vigorously to have our customers return their worn nickel iron parts. To maintain quality control of our alloy iron, we have expanded our metallurgical laboratory.

"To meet the manpower shortage, we are using methods developed during World War II, namely, training learners to do one operation rather than instruct in a trade. In this way, they quickly obtain single operation skill and good productivity. We believe the shortage of sulphur (sulphuric acid) has definitely quickened interest in mechanical cleaning of steel products. This is shown by our inquiries for equipment from producers of finished and semifinished steels."

Mr. Muzzey:

"RESEARCH and development in the ferromagnetic materials continues to be directed toward finding out how to produce better magnetic properties with more uniformity. 1951 saw a greatly increased interest in the magnetic amplifier with an attendant demand for high quality 50 per cent nickel-iron, moly-permalloy and mu-metal cores with closely controlled magnetic properties.

"Although much progress has been made, the alloying, processing and annealing techniques are, in general, not yet a sufficiently precise science to insure the uniformity desired for magnetic amplifier cores. An undesirable amount of selection is required in manufacturing high performance amplifiers.

"Last year also saw a renewed emphasis on the search for magnetic alloys which avoid or reduce the use of strategic materials with a minimum of sacrifice in magnetic properties. This is still a major problem for research and development.

"Acceleration of applied research has been accompanied by increased attention to magnetic phenomena by the solid state physicists. The physical picture of ferromagnetism in terms of molecular structure is becoming clearer and more of a guide to the investigations."

Mr. Hense:

"ALLOY situation is probably more critical with the present emergency than it was during World War II because of the large amounts of alloy necessary for the projected Jet engine programs. The major alloys which are not restricted and which are still available for commercial production are chromium, manganese and boron. The very lean triple alloy boron steels may or may not be available.

"There is very little incentive to use boron steels in the automotive field as long as manganese and chromium alloy steels are available because the boron steels of equivalent hardenability are higher in cost. Test results on the medium carbon grades of boron alloy steels have been encouraging. There should be little difficulty in replacing the popular grades of constructional alloy steels with lower alloy boron steels of equivalent hardenability.

"Very lean alloy boron carburizing steel may be limited in application. Boron is not as effective in the outer, high carbon portions of the carburized case as it is in the low-carbon core material and some trouble with surface hardness has been found. The heat treat distortion characteristics seem to be different than on conventional steels and this in some cases has been troublesome.

"Medium alloy boron steels intended to replace the conventional high alloy carburizing steels are proving satisfactory because there is sufficient base alloy for case hardenability. In this instance the boron is most effective in improving the core properties.

"For applications where core properties are not the criterion, carbonitriding of plain carbon or low alloy steels can be used as nitrogen is very effective in increasing case hardenability. To further conserve

P. J. POTTER

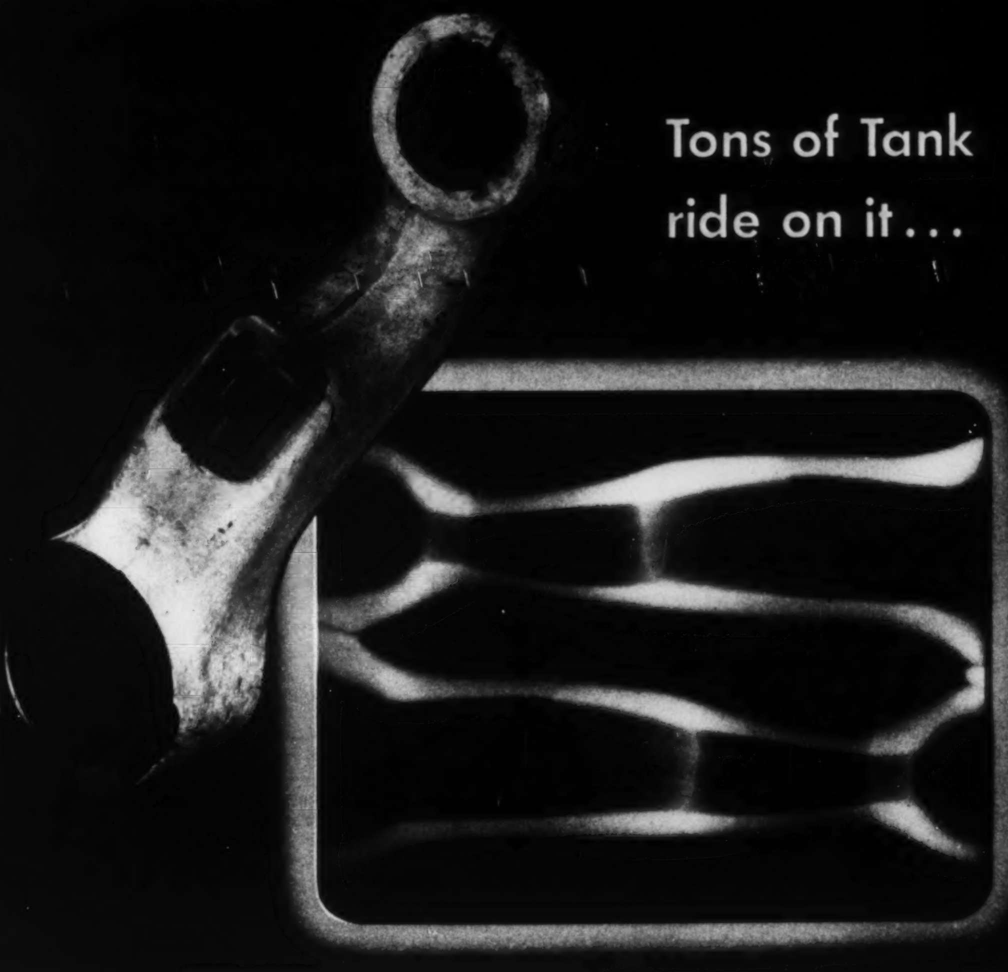
executive vice president, Pangborn Corp., Hagerstown, Md.

D. S. MUZZEY JR.

U. S. Naval Ordnance Laboratory, White Oak, Silver Spring, Md.

VERNON E. HENSE

chief met., Buick Motor Div., General Motors Corp., Flint, Mich.



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alloy, carbon steels with or without boron can be used for some applications by employing flame or induction hardening techniques."

Mr. Killmer:

"SLOW but steady progress marked the 1951 effort to promote the use of boron as an alloying element in constructional alloy steels. It is believed that this trend will continue during 1952 unless more serious scarcities of the conventional alloys increase the tempo.

"A factor tending to retard the acceptance of boron steels is the reluctance of many designers of heavy equipment to change over from the customary grades. There exists a fear that the interior constituents of large heat treated parts may possess impact and endurance properties inferior to those of parts previously made from steel containing high percentages of nickel, chromium, molybdenum etc.

"1952 efforts of a number of research agencies accordingly will be directed toward the goal of establishing whether these fears are justified. This effort is reflected by the initiation of a number of projects, having as their general objective the determination of the possible loss of toughness in partially hardened and annealed structures in steels containing boron. It is hoped that 1952 will provide a reassuring answer to this problem.

"On the more favorable side, the utilization of boron steels is being developed with commendable success by the Society of Automotive Engineers. The various grades are being used with confidence by a growing number of automotive manufacturers."

Mr Beardslee:

"THIS is an era of specialized metals, a period when new materials must be developed to meet the needs of current and future designs. At a time when machines and missiles are passing the speed of sound, when operating temperatures exceed imagination and when atomic power is in the offing we must create new metals for specific applications. These man-created metals must come from the research and development laboratories of the metal-producing companies. And we must get them in the application stage as soon as possible if we are to maintain our superiority of military equipment.

"In our own field, we have seen tungsten carbide, a wear resistant material originally used in cutting tools, become a bearing material and a welded surface. Another recent develpment—chrome carbide—exceeds stainless steel and tungsten carbide in high-temperature oxidation and corrosion resistance.

"Metal ceramics have found applications in both high temperature applications and as thermally sensitive resistors for electrical applications. Other specialized metals that have met specific needs include the Alnicos for magnets and the unique dense new metal, Hevimet, which is an excellent radiation shielding material."

Mr Smith:

RAPID progress in the production of pure titanium and its alloys was the most significant development last year. A great deal of work has been done during 1951 in the field of titanium forging; this has resulted in the release of some production orders for titanium forgings where titanium alloys will be used as standard material.

"Weight is of primary importance in the production of aircraft parts and the use of titanium alloys as a replacement for stainless and alloy steels gives aircraft designers an opportunity to save almost 5 pounds for every 10 pounds of steel forgings in use.

"During 1951 titanium alloys were used almost solely in the production of aircraft engines; now design engineers are studying their application to the other aircraft components such as landing gear and airframe structural parts. In the not too distant future we will see titanium replacing alloy steels in many of the structural parts of military aircraft. With its increased use, a means will be found to lower today's high cost of producing this metal.

"In 1952 much of the new equipment which has been on order for the forging industry will come into operation. This should alleviate to

J. K. KILLMER

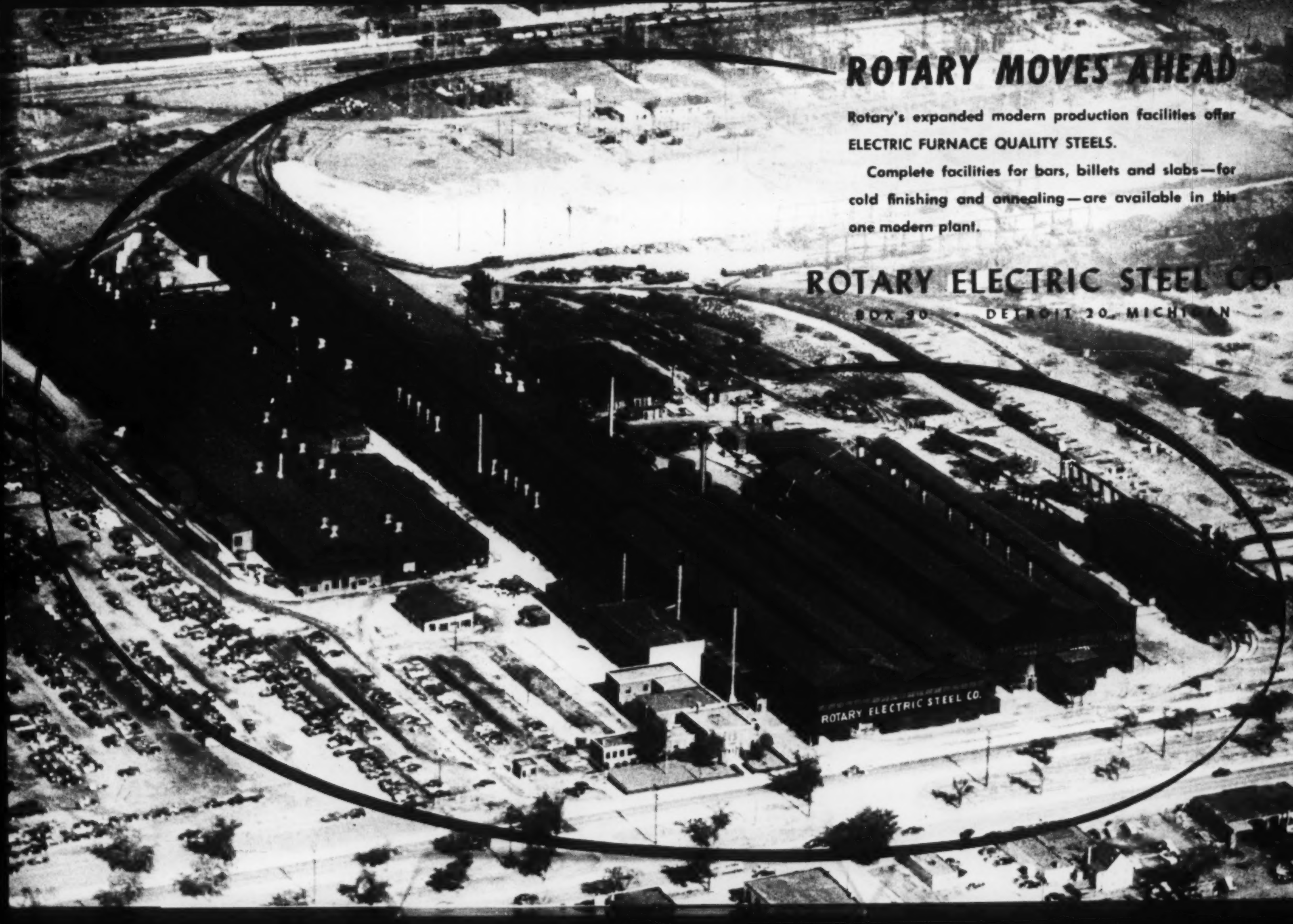
metallurgical engineer, Bethlehem Steel Co., Bethlehem, Pa.

K. R. BEARDSLEE

gen. mgr., Carboloy Dept., General Electric Co., Detroit

C. H. SMITH JR.

president, Steel Improvement & Forge Co., Cleveland



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some extent the very critical shortage of aircraft forgings that has been characteristic of the past 18 months."

Dr. Finlay:

"TITANIUM, nominated the middleweight champion of the structural metals has been a paper champion, its right to industrial stature as a structural metal not yet established. Many technical and economic problems have yet to be solved.

"Nevertheless, during 1951 the crown has settled more firmly onto the growing titan's head. For one reason, although several potent industrial organizations manage the new arrival, he has the best backer in the world, Uncle Sam, standing squarely behind him.

"The defense department — Army, Navy and Air—is promoting titanium by research, development and prototype expenditures to the extent that its growth is outstripping that of any other metal including aluminum, magnesium and stainless steel."

Dr. Gonser:

"EXPANDING production of ingot titanium metal is now approaching a rate of 1000 tons per year, with capacity scheduled to reach about 5000 tons per year by the end of 1952. This is metal produced by magnesium reduction of the tetrachloride.

"Various other methods of extraction, including electrolysis, are under active development, but none has yet reached the commercial stage. Continuous arc melting of titanium sponge, alone or with alloying constituents, has become a commercial operation. Likewise, large ingots of over 1000 pounds are being made. However, difficulties are still encountered from nonhomogeneity in fabricating some alloys. Use of the metal and its alloys is limited largely to experimental and development work, although demands for production items are pressing.

"Activity in titanium alloy development continues to be heavy, although only relatively few alloys have been commercialized. Chief metallic alloying elements are the beta-stabilizing elements, chromium, iron, and manganese, and the alpha-stabilizing element, aluminum. Oxygen and nitrogen are present as impurities in titanium, but oxygen, particularly, is finding continued use as an intentional alloying element.

"Chief problems with the alloys now are brittle welds and poor machinability. Progress is being made in producing ductile welds through the use of alloys that are predominantly one phase, either alpha or beta.

"A titanium-zirconium panel of the Metallurgical Advisory Board was formed during the year to aid in developing coordinated research programs and obtain factual information for use in guiding governmental expenditures on titanium.

An ASTM task group is setting up tentative standards for compositions, properties, and analyses of titanium and some of its alloys."

Mr. Jameson:

"LABORATORY experiments with boron-treated steel reveal that whereas in the carburizing grades such as 50B20 and 80B20 the core hardenability is greater than 8620 or 4720, the case hardenability of these boron steels is less than the 8620 and 4720.

"In instances where the carbon content is in excess of 0.80 per cent, boron is relatively ineffective in increasing hardenabilty. Result of this condition is that there is considerable distortion after heat treatment caused by greater expansion of the core of the boron treated carburized parts, which means refiguring of the green machine sizes.

"As a consequence of the relative ineffectiveness of boron as an increaser of hardenability of the case of carburized parts, the H value of the quench must be increased. Furthermore, in order to obtain commercial effectiveness, the carburizing procedure must be controlled to reduce the carbon content of the case. Problem of distortion, especially in gears, has not been adequately solved in many cases.

"Use of lower alloyed boron treated steels in the medium carbon grades containing from 0.35 to 0.50 carbon, have by numerous tests been found to be adequate substitutes for the higher alloyed steels previously used. Use of boron treatment for the higher

WALTER L. FINLAY

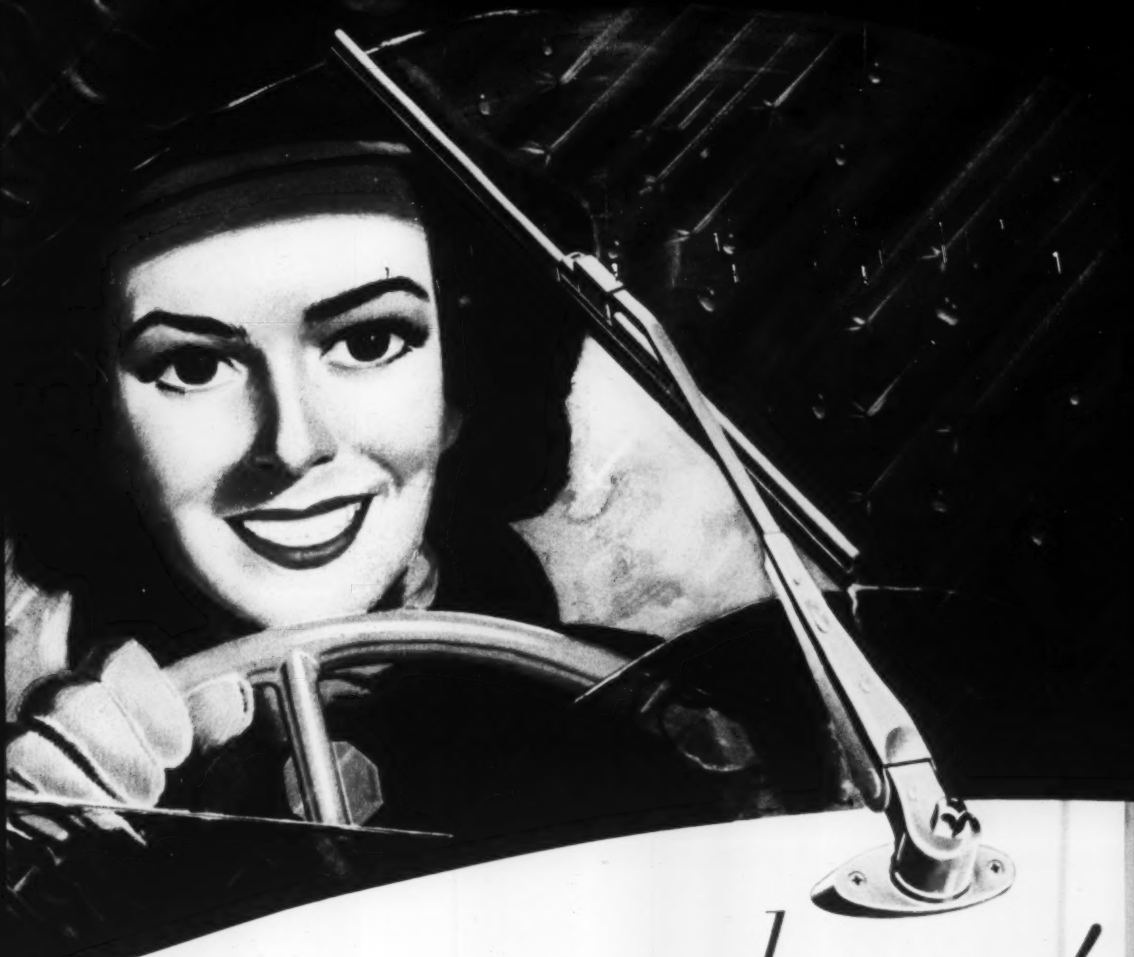
research manager, Rem-Cru Titanium Inc., Midland, Pa.

BRUCE W. GONSER

Battelle Memorial Institute, Columbus, O.

A. S. JAMESON

supervisor, metallurgical res. labs, International Harvester Co., Chicago



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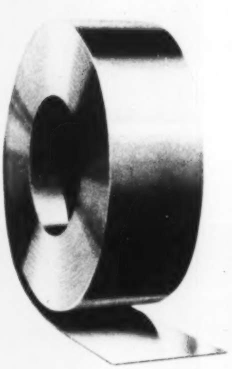

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carbon alloyed steels such as 52100 for the purpose of lowering the alloyed content has been experimented with. It has been found that with the carbon content about 1 per cent the advantages gained by the addition of boron are too slight to be of great practical importance."

Dr. Clark:

"INVESTIGATIONS dealing with the development of metals for high temperature military applications have formulated the so-called super alloys containing ever increasing amounts of the least available metals, such as nickel, cobalt, columbium, molybdenum and tungsten. As a result many of the alloys used, or recommended for these applications, contain only 50 per cent or less iron.

"English engineers have already approached this problem from a different angle and through the close cooperation of the metallurgical and design engineers (considering the possibility of reducing temperatures by cooling) are now using the lower-alloyed steels in many of the high-stress, intermediate-temperature (up to 1000 to 1100° F) applications in which the life expectancy is 1000 hours or less. One group of these alloys is of the 3 Cr. – 0.50 Mo – 0.80 V – 0.50 W type while another is of the 12 Cr type containing relatively small amounts (less than 1.0 per cent each) of Mo, V and W.

"Certain of the Cr-Mo-V-Si steels developed in this country several years ago are capable of rendering excellent service in these same applications. For example, Timken 17-22A(S), when properly heat treated by normalizing and tempering to about 300 Brinell, has a 1000-hour rupture strength at 1000° F in excess of 60,000 psi which is equal to, or better than, the English steels. At 1100° F its rupture strength drops to 20,000 psi but by relatively slight changes in its composition this value has been raised too 30,000 to 35,000 psi. The only critical short alloy contained in either 17-22A(S), or its modification, is molybdenum, and the amount present is small, being 0.50 and 1.0 per cent respectively."

Mr. Coleman:

"BORON is being substituted in steel for some alloying elements. Excellent physical properties are being obtained and sometimes through forced necessity one finds that certain changes might be for the better.

"Titanium is still in the spotlight; one of the big factors is the analysis of titanium alloys. So much experimental work is being done with various alloys that methods of analyses must be worked up for specific elements in the alloys. There is tremendous activity in furthering research in this particular field.

"More analyses are being requested on ductile iron. The spectrograph here plays the leading roll for the determination of the magnesium content. Many new uses for the iron are being discovered.

"This coming year will be one in which there will be a considerable increase in testing and inspection of the newer combinations as well as the general routine production of materials. We have already noticed a vast step in this direction."

Mr. Gannett:

"CURRENT shortage of structural steel has given a strong impetus to the development of new and ingenious structural designs which have the present virtue of using far less steel than the traditional systems.

"Prestressed concrete framing and precast long-span structural elements are two such developments. Many others are in the embryo stage employing glass, specially treated wood, aluminum and magnesium. During this period when they may be used as an expedient, it is entirely possible that some of these techniques may be so improved that, when structural steel again is readily available, these new structural systems may have reached competitive status.

"This is a real challenge to the steel industry—made more serious by the present lack of intensive research and development leading toward the improved efficiency of the more traditional structural steel designs.

"Practically no builders have the resources needed to support individual research, so it is up to the producers and fabricators and

C. L. CLARK

met. eng., Steel & Tube Div., Timken Roller Bearing Co., Canton, O.

W. B. COLEMAN

president, W. B. Coleman & Co., Philadelphia

J. K. GANNETT

V.P. & director of engineering research, Austin Co., Cleveland

the organizations which they support to do the work which will make it easier for construction firms, generally, to get the maximum value out of all the steel they buy."

Mr. McKenna:

"OUTSTANDING progress was made in 1951 in metallurgical development for tool composition and and for Kentanium, our distinctive heat-resistant material. Improved methods were adopted for refining and treatment of ores to assure certainty of supply and better control. New buildings were erected and additional equipment was installed for the refinement of columbium, tantalum, cobalt, and additional amounts of tungsten. Many of these materials had been purchased in the refined state.

"To supplement our tungsten supply, the company purchased two mines, one in Nevada and one in California, which produce tungsten-bearing ores. Output of both properties is being increased. Capacity of the carbide department was greatly enlarged by additional processing equipment, enabling us to produce more Kennametal blanks for a growing business in metalworking and mining tools.

"A new factory is being erected at Bedford, Pa., 60 miles east of the main plant at Latrobe, which will provide a much needed expansion of facilities for fabrication of mining tools, using Kennametal inserts made at Latrobe.

"Largest potential use for Kentanium is in elements for jet engines and gas turbines, where higher operating temperatures are desirable because of greater efficiency. We are now manufacturing turbine blades in experimental quantities for leading engine builders and government agencies. A large volume of business in this field is anticipated. Kentanium uses no tungsten, but is composed chiefly of titanium carbide. Superior compositions have been developed with nickel as the binder or auxiliary metal, in place of short-supply cobalt, commonly used in cemented carbides.

Mr. Crawford:

"ACTIVITY in gas turbine design continues to be found principally among the builders of aircraft engines. Attention is still being given to the possibilities of the gas turbine as a prime mover or auxiliary unit for industrial use.

"The gas turbine used as a source of jet power for aircraft is attractive principally because of the high air speeds attainable. Increased power to give greater speed is desirable even at the expense of efficiency. This calls for higher temperatures.

"At the present time those alloys which have been time-tried in aircraft engines are still being used but are operated close to their peak temperature of usefulness. There is also some pressure to remove those metals which are critically scarce. Engines have been built for trial with a considerably lowered total alloy content. Whether the demand for higher temperature of operation will overbalance the need to conserve scarce metals remains an unsettled question."

Dr. Young:

"MATERIAL shortages are forcing metal finishers to do a better controlled job. Nickel is difficult to obtain even with priorities; cadmium is short and so are zinc and copper. Stress during the year therefore has been put on conserving as much of the metals as possible.

"In the electrodeposition field emphasis has been placed on thin deposits produced with solutions which are constantly and carefully controlled so that better deposits are produced. Care has been taken in the preparation of metal and alloy surfaces prior to plating to make sure that rejects were reduced to a minimum. Bright deposits and semibright deposits continue to gain ground; methods of cleaning the base metal have been worked over so that the surfaces going to the plating tanks are in good condition.

"Pickling baths are watched more carefully to see that minimum amounts of metal are dissolved. The cutting down, polishing and buffing operations have been checked to see that the best cut is obtained and the residue left behind can be easily cleaned. This has resulted in upped production and fewer rejects.

"Liquid buffing compounds are beginning to find their place in

PHILIP M. McKENNA

president, Kennametal Inc.,
Latrobe, Pa.

C. A. CRAWFORD

development & research div., International Nickel Co. Inc., New York

C. B. F. YOUNG

executive vice president, National Southern Products Corp., New York

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industry. They have many good points. Some industries that investigated these a few years ago and rejected them are now beginning to look the second time on liquid compounds for cutting down, buffing and polishing operations."

Mr. Bass:

"BERYLLIUM industry continued to operate at high levels during 1951; in fact, the demand for beryllium copper alloys exceeded that for any previous period in the history of the industry.

"This demand was due, not to major or novel developments, but rather to continued, and in fact increasing, recognition by engineers and designers of the unique combination of properties and advantages inherent in the use of beryllium copper and other beryllium alloys and products.

"Several beryllium copper alloys varying in beryllium content and offering different combinations of properties are now available. This permits efficient utilization of beryllium consistent with the engineering needs of the application.

"Some of the more interesting beryllium copper applications at present involve the use of strip in heavy-duty and precision mechanical applications in the form of springs, clips, contacts, switch blades, pressure responsive diaphragms, etc. Beryllium copper rod is fabricated into gears, bushings, bolts and similar forms for use by the aircraft, submarine and automotive industries. Beryllium copper castings are being utilized in many forms and alloys in such applications as low-sparking safety tools, heavy-duty switchgear, precision castings, dies for molding plastics, and diamond drill bits. Resistance welding wheels, tips, jaws and rods made out of the group of low-beryllium high-conductivity alloys were also in strong demand."

Dr. Thompson:

"OUTSTANDING developments in metallurgical activities for the defense effort during 1951 have been the organization of the Metallurgical Advisory Board, under the auspices of the National Academy of Sciences and the National Research Council, and the World Metallurgical Congress, held in October under the auspices of the American Society for Metals and Economic Cooperation Administration. The MAB is actively engaged in studies of critical metals and in many respects resembles the War Metallurgy Committee of World War II. Presence of so many eminent metallurgists from abroad and their willingness to exchange information will be beneficial.

"Specific developments in the conservation of critical metals in which the National Bureau of Standards has had a part, include the further development of the use of boron in place of scarce alloying elements in conferring hardenability, and the demonstration that combinations of tantalum and columbium serve satisfactorily in at least some of the applications previously reserved for columbium.

Mr. Wilson:

"SPRINGS for operation on elevated temperatures have been developed to a still greater extent in the last year. This was largely due to the increased use in the automotive industry of automatic transmissions which contain many such springs. Because a high percentage of these springs are made of SAE 9254, chrome-silicon steel, increased production of this wire has resulted.

"With restriction in the use of nickel, production of stainless springs has decreased. Carbon steel with various protective finishes has replaced stainless. As a corrosion-resistant finish zinc commonly replaces cadmium. There has also been increased development of chromate and other treatments subsequent to zinc plating to improve corrosion resistance and appearance. Baked enamel finishes, often preceded by a phosphate coating have also been used for a plating substitute.

"Inconel and Inconel X are being used considerably for springs on military projects. Low carbon strip steel is being tried out on some springs which generally are made of high carbon strip. In this case, after the spring is formed it is given a carburizing and then a carbon - diffusion treatment. One automotive manufacturer is making an important spring in this manner with excellent results. It is rumored that another manufacturer is about to adopt the process. Substantial saving in ma-

N. W. BASS

assistant vice president, Brush Beryllium Co., Cleveland

JOHN G. THOMPSON

chief, div. of metallurgy, National Bureau of Standards, Washington

G. D. WILSON

ch. met., Barnes-Gibson-Raymond Div. Associated Spring Corp., Detroit, Mich.

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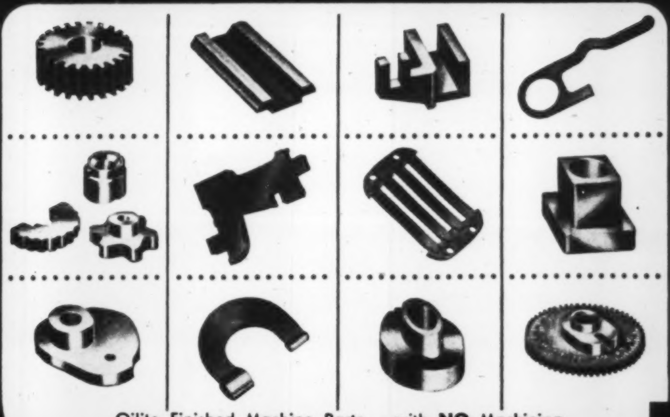

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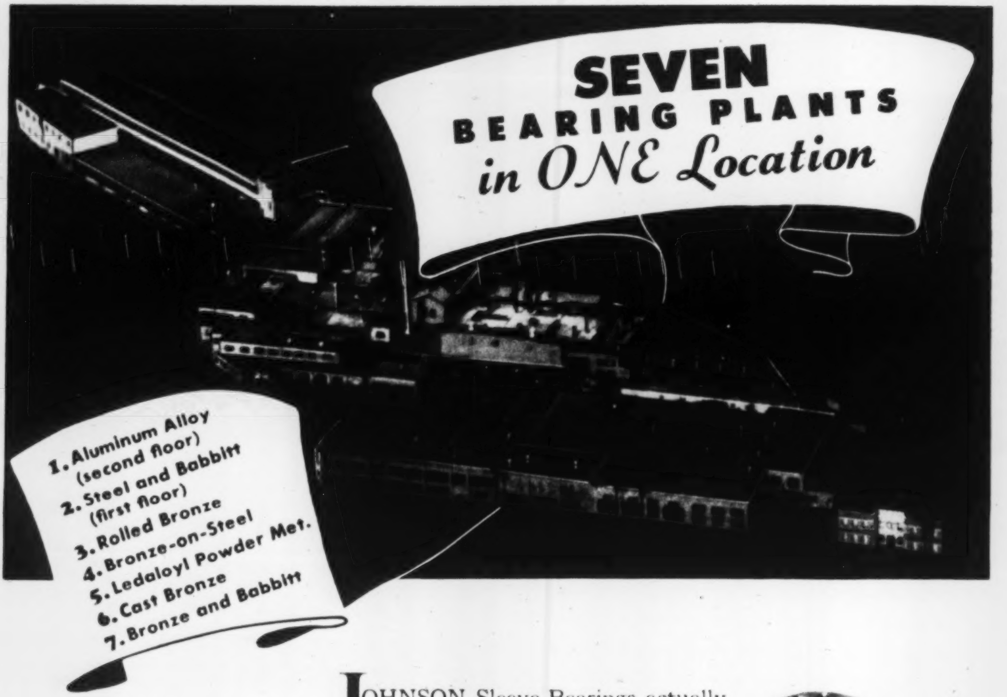
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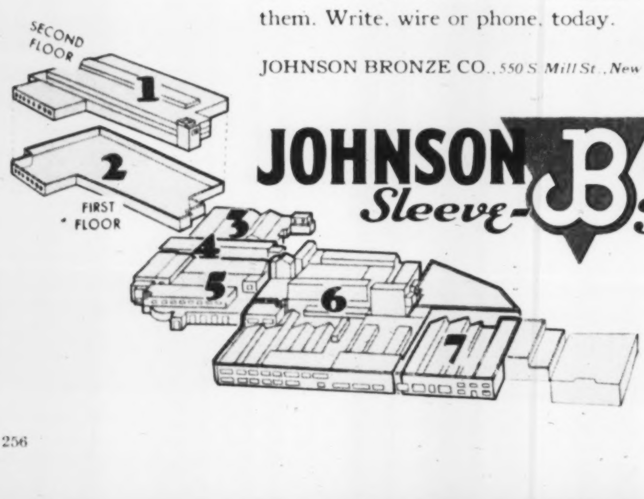
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terial cost and tool up-keep are claimed."

Mr. Cross:

"**DIFFICULT** problem in implementing the jet-engine program is the shortage of critical metals such as cobalt, columbium and tungsten. Alloy S-816, used for turbine blades in the J-33, J-35 and J-47 engines contains nominally 40 per cent cobalt and 4 per cent columbium. Considerable attention is being given to the development of nickel-base alloys containing no columbium and a minimum of cobalt.

"Major accomplishment of the year was the development of melting techniques for the production of nickel-base, titanium-hardened alloys, both clean and free from objectionable titanium-containing inclusions, a condition difficult to achieve in titanium-bearing alloys. These nickel-base alloys, identified as Waspalloy and M-252, contain considerably lower cobalt contents (10-14 per cent) and no columbium or tungsten. They do contain some molybdenum (3-10 per cent), which is a metal in more plentiful supply than cobalt, columbium, and tungsten.

"Further savings of columbium have been effected by the substitution of titanium-stabilized stainless steel for the columbium-stabilized grade.

"Other high-temperature materials of great potential value which save strategic metal are the powder-metallurgy-produced Kentanium compositions composed of titanium carbide as the chief ingredient and having a matrix of nickel instead of cobalt. Very interesting combinations of strength, ductility, oxidation, and thermal-shock resistance are obtained in these ceramic-metal combinations where nickel has been used as the matrix metal."

Mr. Sears:

"**AGMA** activity in the advancement of the gear engineering art goes steadily forward. Presently at work developing 'Standards' are at least 125 engineers, representing over 75 member companies. These men comprise the membership of the 23 AGMA committees assigned to definite projects.

"From a statistical point of view, the gear industry's general health is on a par with all other phases of our whole industrial economy. The index stands at 703.4 per cent as of October 31, 1951—(1935—1939 = 100 per cent).

"New gearing problems arising from higher speed propulsion of land, sea and air craft are being encountered. However, the industry is keeping pace. More experimentation and actual use of new techniques involving the use of ductile iron and boron steels continues.

"Users of gears and geared products can assume with the utmost confidence that the industry is alert to its responsibilities to the nation, that no part of our economy will bog down because of gear failure."

Mr. Trundle:

"**DAILY**, in the average engineering department, several proposed engineering changes are evaluated, rejected, or effected. All too often the real opportunities existent in complete redesign are overlooked. Actually, through market research and redesign it is possible to solve concurrently, many of the problems of substitute materials, rising costs, endless changes, poor delivery, and simultaneously, improve the company's market position.

"As an example, a client produced a small machine for a limited market. Though initially very profitable, rising costs, increased competition, and frequent material shortages narrowed the profit margin. A number of isolated changes had been effected but the company became increasingly aware of the need for a thorough restudy of the product as a basis for future action.

"First, we identified the potential market and defined the company's probable participation. Certain untouched market possibilities were discovered. Through this research, the merits and weaknesses of the company's product and those of its competitors were evaluated. Features desired by potential users were studied. Acceptable selling price ranges were determined.

"From this factual and usable data, we redesigned the machine. Known production problems, high cost operations, and material prob-

HOWARD C. CROSS

Battelle Memorial Institute, Columbus, O.

JOHN C. SEARS

executive sec., American Gear Manufacturers Association, Pittsburgh

GEORGE T. TRUNDLE JR.

president, Trundle Engineering Co. Cleveland

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lems were intensively studied. The final approved design satisfied the market, cost, and production requirements imposed."

Dr. Harrington:

"NEEDS of 1951 have, in most places, shifted the direction of research from the self-hypnosis of mathematical metallurgy to the more productive factual alloy research. Typical of the ferrous field are the following studies made during 1951.

Grain size in Al-killed steel sheets, grain boundary migration rates, rapid tempering of high speed steels, burst phenomenon in martensite transformations.

"Recent reports in the nonferrous field include the following: Secondary recrystallization in copper wire, properties of Mo single crystals, further studies of Ti and its alloys, isothermal transformations and properties of Al-bronze.

"Alloy research has contributed a number of developments directly applicable to production or engineering usage: Simple gas-relief treatment renders Al-alloy die castings fully heat treatable, practically free from destructive blistering and warping."

Mr. Hensel:

"RESEARCH work on metal ceramics continues. One composition which appears to have worthwhile high temperature properties, in-

R. H. HARRINGTON
metallurgical consultant
Schenectady, N. Y.

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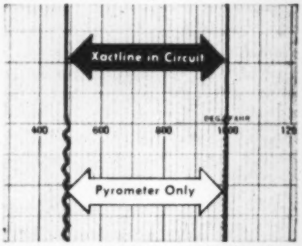

Exact reproduction of temperature chart for a heating process showing the comparison of the "Straight-Line" temperature control produced by XACTLINE and the saw tooth curve obtained with only conventional control.

XACTLINE is applicable to any indicating or recording pyrometer control of the millivoltmeter or potentiometer type. It should be used wherever close temperature control is required—any type of electrically heated oven, furnace, kiln, injection molding machine, and fuel-fired furnaces equipped with motor-operated or solenoid valves.

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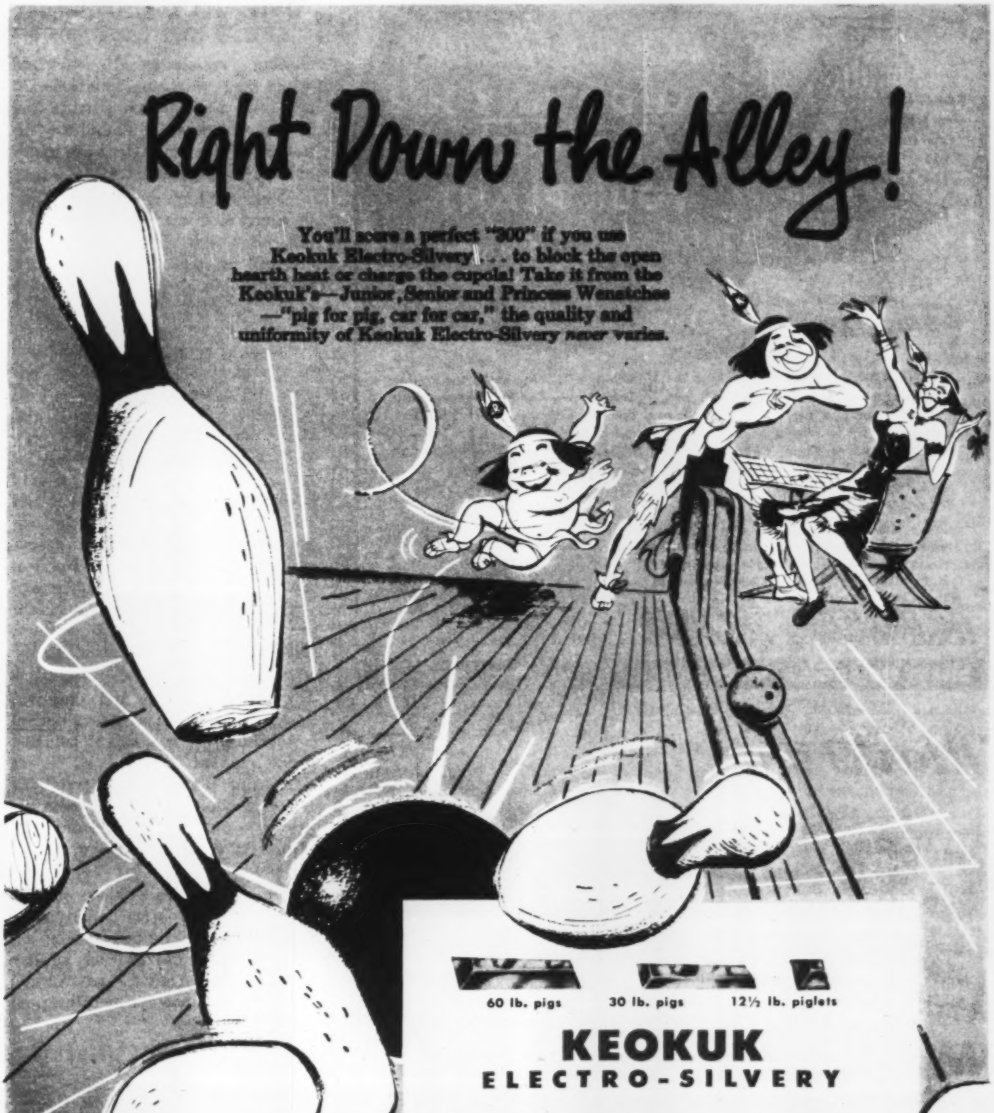

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"A new spot welding electrode identified as Nu Wrinkle Cap consists of a small inexpensive replaceable cap, easily inserted and removed from a fluted electrode shank. When the welding face is no longer serviceable it is only necessary to replace the small and inexpensive Mallory alloy cap, reducing the cost per weld and conserving critical material. The cap has a corrugated skirt which provides secure mechanical attachment, excellent electrical contact, and a positive coolant seal.

"Thoriated tungsten electrodes are nonconsumable and designed specifically for inert gas shielded arc welding using straight polarity direct current. Presence of thoria uniformly distributed throughout the tungsten electrode substantially increased arc stability and permits easy starting at low open circuit voltages.

"Silver-cadmium oxide contact materials have been widely used for some time in heavy-duty relays, motor controls and similar mechanisms. They have always been made by powder metallurgical

F. R. HENSEL

V.P. in charge of engineering, P. R. Mallory & Co. Inc., Indianapolis

If you want to know how to save steel, here's the hole story!

IF you manufacture hollow parts, chances are you can take advantage of this idea for saving steel. Instead of using bar stock, use Timken* seamless tubing!

With Timken seamless tubing, the center hole is already there. There's less stock to machine away, less scrap. You get more parts out of every ton of steel you buy.

And to help you save even *more* steel, the Timken Company offers a tube engineering service which recommends the most economical tube size for your job—guaranteed to clean up.

By using Timken seamless tubing, you also boost the productivity of your machine tools. Since drilling the center hole is eliminated, finish boring is often your first production step. Screw machine stations are released for other operations. You have more machine capacity without adding more machines.

All this and better quality, too! The piercing process by which Timken seamless tubing is made is basically a forging operation. The tubing has a uniform spiral grain flow for greater strength and a refined grain structure which brings out the best in the quality of the metal. And the Timken Company's rigid quality control insures uniformity from tube to tube and heat to heat.

For further information on the use of Timken seamless tubing, write The Timken Roller Bearing Company, Steel and Tube Division, Canton 6, Ohio. Cable address: "TIMROSCO".

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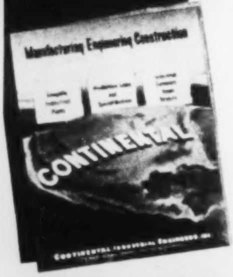
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methods which limited the shape of parts that could be produced economically. Now a new process makes possible the production of silver-cadmium oxide materials in the form of rivets and other shapes not heretofore practical."

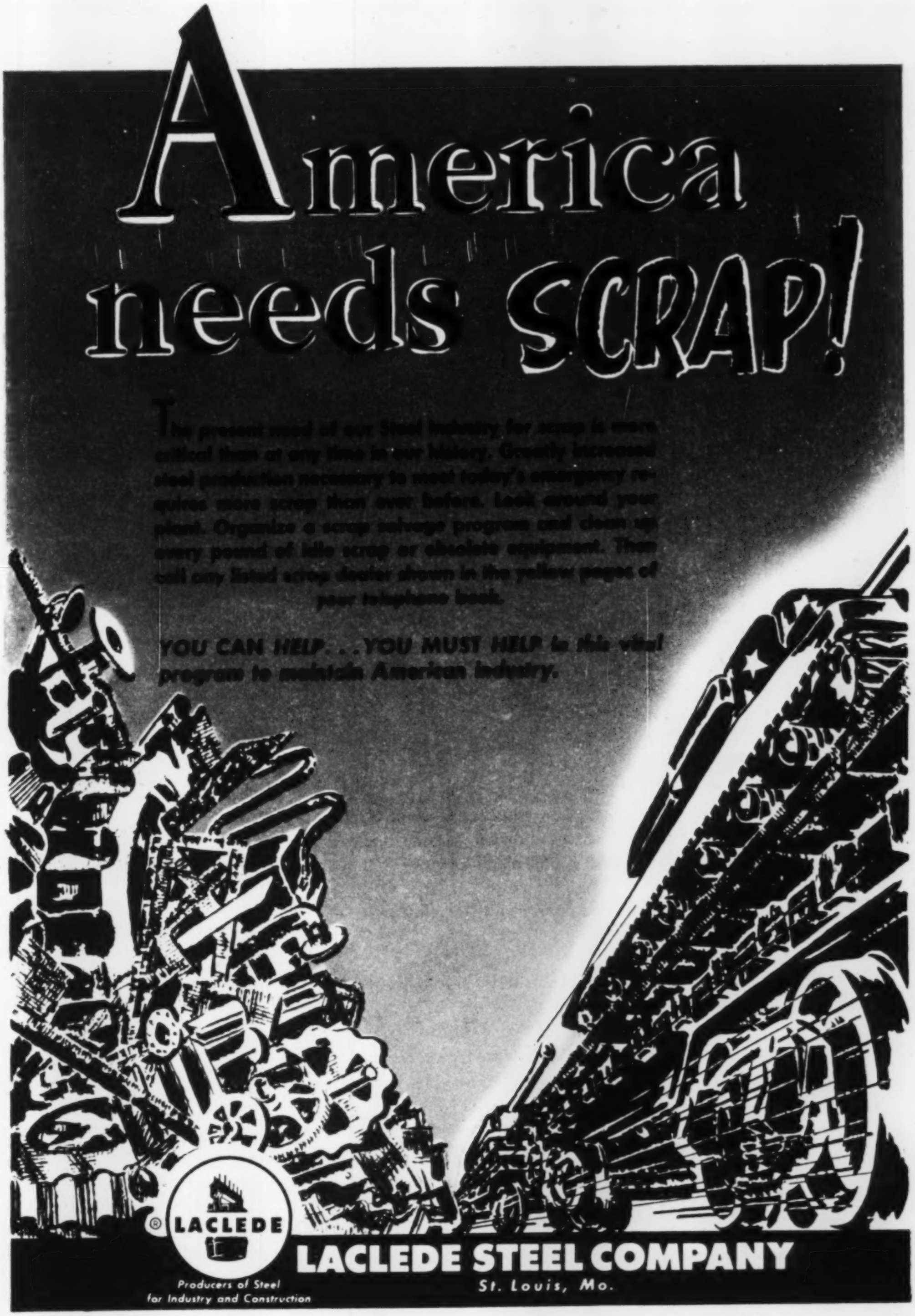
Mr. Behnke:

"SHIELDED inert gas metal arc welding, using consumable coiled rod and an inert gas such as argon, was used increasingly in the fabrication of aluminum and other nonferrous materials in 1951. During 1951, Linde announced its oxygen-argon mixture, called Argon-Sigma Grade, to open a new field of sigma welding on ferrous alloys. Principal benefits it offers, in comparison to pure argon, lie in the phenomena of improved metal transfer through the arc, and promotion of better coalescence between weld metal and base metal.

"Metal transfer is improved by a drop rate increased by 30 to 50 times, in terms of number of drops per second. This means that arc stability is much greater, because many more small-diameter drops are projected through the arc, even though deposition rate might not be increased. Practical significance of this feature is explained by two examples. For a given welding current, a filler rod diameter one to two sizes larger than usual can be used without sacrificing arc stability. This effects substantial savings in rod cost per pound. Stated another way, the smallest

E. R. BEHNKE

development engineer, Linde Air Products Co., New York



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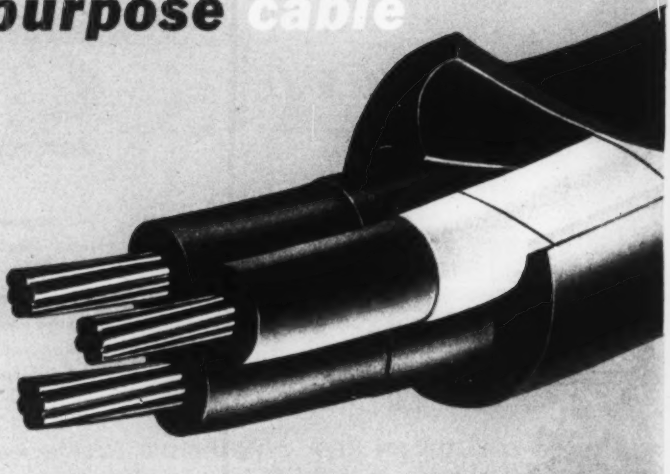

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standard rod sizes can be used with low currents on thin material. Usually, impractically small, special rod would have to be purchased at a premium for use with pure argon.

"Basic advantages of sigma welding, which are absence of need of flux, little or no alloy loss, low spatter and stub loss coupled with excellent visibility, are therefore reinforced by the special properties of the mixture."

Mr. Ziegfeld:

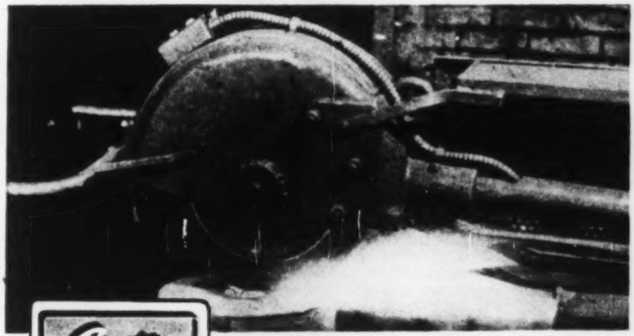
"CONTINUING development in the use of the vacuum dezincing process for removing traces of zinc from refined lead; the venturi scrubber for collecting lead fume and dust from secondary lead blast furnaces; and oxygen-enriched air in lead blast furnaces have held the fore in lead extractive metallurgy.

"Latest developments in the lead alloy field include a new lead cable sheathing alloy containing arsenic, bismuth and tin which is said to have a greatly improved creep resistance, higher fatigue endurance limit and a relative increase in service life of more than 300 per cent. Lead alloyed with fractional percentages of calcium, though not new to the bearing metal industry and used to a limited extent in cable sheathing, has been the subject of much publicity.

"Service tests are said to show that an alloy of lead containing about 0.1 per cent calcium is par-

ROBERT L. ZIEGFELD

secretary, Lead Industries Association, New York



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ALLOYS FOR THE STEEL, IRON, AND NON-FERROUS INDUSTRIES

BORON ALLOYS

PRODUCT*	NOMINAL COMPOSITION	USES
Ferroboron Min. 10.00% Boron Grade	Silicon........max. 1.50% Aluminum.....max. 0.50% Carbon........max. 1.50%	Increases hardenability of steel; also, for additions to malleable iron and aluminum alloys.
Min. 17.50% Boron Grade	Silicon........max. 1.50% Aluminum....max. 0.50% Carbon.......max. 0.50%	
Manganese-Boron	Boron........min. 17.50% Manganese...approx. 75% Silicon........max. 1.50% Carbon...........max. 3% Iron.............max. 5%	Used to cleanse and deoxidize non-ferrous alloys.
Nickel-Boron	Boron.........15 to 18% Silicon........max. 1.50% Aluminum.....max. 1.00% Carbon.......max. 0.50% Iron.........max. 3.00% Nickel............Balance	Special boron alloy used principally for deoxidizing nickel and its alloys.
Boron Carbide	Boron..........45 to 50% Carbon ....45 to 50%	Deoxidizer for non-ferrous alloys.
Calcium Boride	Boron..........38 to 42% Calcium........27 to 32% Carbon.........15 to 20%	Welding rod coating.
SILCAZ Alloy	Boron.......0.55 to 0.75% Silicon..........35 to 40% Calcium.........9 to 11% Aluminum........6 to 8% Titanium........9 to 11% Zirconium........3 to 5%	A complex boron addition agent for increasing the hardenability of steel.

CALCIUM ALLOYS

PRODUCT*	NOMINAL COMPOSITION	USES
Calcium-Silicon	Calcium ....30 to 33% Silicon.........60 to 65% Iron...........1.50 to 3%	Deoxidizer for quality ingot steel. Also used in high-tensile gray irons.
Calcium-Manganese-Silicon	Calcium........16 to 20% Manganese.....14 to 18% Silicon..........53 to 59%	A complex deoxidizer used widely in production of steel castings.
Calcium Metal Regular Grade	Calcium...............98% (Cylinders, Slabs, Cut Pieces, or Turnings)	Reducing agent in metallurgical applications, deoxidizer and degasifier for non-ferrous metals, particularly magnesium.
Distilled Grade	Calcium....approx. 99.90% (Irregular pieces from pea size to 14 in. lumps)	For special applications requiring calcium of very high purity.

CHROMIUM ALLOYS

PRODUCT*	NOMINAL COMPOSITION	USES
Low-Carbon Ferrochrome	Chromium.......67 to 71% Silicon......0.30 to 1.00% Carbon (10 Grades) max. 0.03 to max. 2.00%	Production of stainless steels and high-temperature alloys requiring low carbon content.
High-Carbon Ferrochrome Max. 4.50, 5.00, or 6.00% Carbon Grade	Chromium......67 to 70% Silicon.......... 1 to 2%	For production of engineering alloy steels and other alloy steels of moderate chromium content.
Max. 7.00% Carbon Grade	Chromium......66 to 69% Silicon.......... 1 to 3%	
Min. 7.00% Carbon Grade	Chromium......65 to 68% Silicon........... 1 to 3%	
Nitrogen-Bearing Low-Carbon Ferrochrome	Chromium.......67 to 71% Silicon......0.30 to 1.00% Carbon........max. 0.10% Nitrogen....approx. 0.75%	For additions of nitrogen to improve properties of high-chromium steels.
"SM" Ferrochrome	Chromium......60 to 65% Silicon .... 4 to 6% Carbon......... 4 to 6% Manganese..... 4 to 6%	A high-solubility chromium addition for steel or iron in either furnace or ladle.

CHROMIUM ALLOYS cont.

PRODUCT*	NOMINAL COMPOSITION	USES
Foundry Ferrochrome High-Carbon Grade	Chromium......62 to 66% Silicon......... 7 to 10% Carbon......... 5 to 7%	Developed especially for high-solubility ladle additions of chromium to improve composition and properties of cast iron.
Low-Carbon Grade	Chromium......50 to 54% Silicon.........28 to 32% Carbon.......max. 1.25%	
Chromium Metal Low-Carbon Grades	Chromium.......min. 97% Carbon ......max. 0.10% and 0.50% Iron............max. 1%	Production of wide variety of non-ferrous chromium-bearing alloys, including electrical resistance alloys and high-temperature alloys.
High-Carbon Grade	Chromium......87 to 90% Carbon......... 9 to 11% Iron..........max. 1.25%	
"EM" Ferrochrome-Silicon No. 1 Grade	Chromium......39 to 41% Silicon.........42 to 46% Carbon.......max. 0.05%	In production of stainless steels, these alloys are used to reduce metal oxides from the slag back into bath.
No. 2 Grade	Chromium......36 to 39% Silicon.........36 to 39% Carbon.......max. 0.05% Aluminum...... 7 to 9%	
"EM" Ferrosilicon-Chrome	Chromium......50 to 54% Silicon.........28 to 32% Carbon.......max. 1.25%	For adding chromium and silicon to steels containing up to 1 or 2 per cent chromium.
"EM" Chromium Briquets (Hexagonal Shape)	Chromium............2 lb. Total Weight.......3 1/8 lb.	For adding chromium to cast iron in the cupola.

COLUMBIUM ALLOYS

PRODUCT*	NOMINAL COMPOSITION	USES
Ferrocolumbium	Columbium.....50 to 60% Silicon..........max. 8% Carbon.......max. 0.40%	Stabilizer in austenitic chromium-nickel stainless steels. Also constituent of high-temperature alloys.
Ferrotantalum-Columbium	Columbium...approx. 40% Tantalum.....approx. 20% Cb + Ta ....min. 60% Silicon...........4 to 6% Carbon........max. 0.30%	Another stabilizer, used to supplement ferrocolumbium, in austenitic chromium-nickel stainless steels. Also used in high-temperature alloys.

MANGANESE ALLOYS

PRODUCT*	NOMINAL COMPOSITION	USES
Standard Ferromanganese Regular Grade	Manganese.....78 to 82% Carbon........approx. 7% Silicon..........max. 1%	Most common means of adding manganese to steel for both alloying and deoxidizing purposes. Also for counteracting sulphur in steel and cast iron.
Low-Phosphorus Grade	Manganese.....78 to 82% Carbon..........max. 7% Silicon..........max. 2% Phosphorus...max. 0.10%	
Low-Carbon Ferromanganese Low-Phosphorus Grade	Manganese......min. 90% Carbon........max. 0.07% Phosphorus...max. 0.06%	Additions of manganese to steels of low-carbon specification, particularly stainless steels of 18 per cent chromium, 8 per cent nickel type.
Regular Grades	Manganese.....85 to 90% Carbon ....max. 0.07, 0.11 to 0.15, 0.30, or 0.50%	
Regular Grade (High-Silicon)	Manganese.....80 to 85% Carbon.......max. 0.75% Silicon......... 5 to 7%	
Medium-Carbon Ferromanganese	Manganese.....80 to 85% Carbon.........max. 1.25 to 1.50%	For making low- and medium-carbon manganese steel and Hadfield steel.
Silicomanganese Max. 1.50% Carbon Grade	Manganese.....65 to 68% Silicon.........18 to 20%	A versatile alloy useful as furnace block, deoxidizer, and also for making manganese additions to steel in the ladle or in the furnace.
Max. 2.00% Carbon Grade	Manganese.....65 to 68% Silicon.......15 to 17.50%	
Max. 3.00% Carbon Grade	Manganese.....65 to 68% Silicon.......12 to 14.50%	

***All of the alloys and metals listed are produced in the usual lump, crushed, or ground sizes, except where other special forms are indicated.**

MANGANESE ALLOYS cont.

PRODUCT *	NOMINAL COMPOSITION	USES
Low-Iron Ferromanganese	Manganese.....85 to 90% Carbon.....approx. 7.00% Silicon...........max. 3% Iron.............max. 2%	For high manganese additions to certain non-ferrous alloys, particularly aluminum.
Manganese Metal	Manganese......min. 96% Carbon.......max. 0.20% Silicon........max. 1.00% Iron..........max. 2.50%	Used both as deoxidizer and alloy in production of numerous non-ferrous metals and alloys.
"EM" Silicomanganese Briquets (Square Shape)	Manganese...........2 lb. Silicon..............½ lb. Total Weight.......3½ lb.	For adding manganese (with silicon) to cast iron in the cupola.
"EM" Ferromanganese Briquets (Oblong Shape)	Manganese...........2 lb. Total Weight.........3 lb.	For adding manganese (without silicon) to cast iron in the cupola.

SILICON ALLOYS

PRODUCT *	NOMINAL COMPOSITION	USES
50% Ferrosilicon		Deoxidizer for most grades of killed or semi-killed steel. Blocking grade specially sized for maximum efficiency.
Regular Grade	Silicon.........47 to 51%	
Blocking Grade	Silicon........47 to 51%	
Low-Aluminum Grade	Silicon.........47 to 51% Aluminum.....max. 0.40%	
65% Ferrosilicon Low-Aluminum Grade	Silicon....61.50 to 66.50% Aluminum.....max. 0.50%	Mainly for production of electrical sheet steel.
75% Ferrosilicon		Deoxidizer and alloy for production of high-silicon spring and electrical sheet steel. Graphitizing inoculant for cast iron.
Regular Grade	Silicon.........73 to 78%	
Low-Aluminum Grade	Silicon.........73 to 78% Aluminum.....max. 0.50%	
85% Ferrosilicon		Enables melter to add higher percentages of silicon without chilling metal in ladle. Graphitizing inoculant for cast iron.
Regular Grade	Silicon.........83 to 88%	
Low-Aluminum Grade	Silicon.........83 to 88% Aluminum.....max. 0.50%	
90% Ferrosilicon		Permits large additions of silicon without harmful chilling effect.
Regular Grade	Silicon.........92 to 95%	
Low-Aluminum Grade	Silicon. ....92 to 95% Aluminum.....max. 0.50%	
Silicon Metal		
Regular Grade	Silicon.....min. 97 or 96% Iron........max. 1 or 2%	Additions of silicon to non-ferrous metals, particularly aluminum and copper, to improve physical properties.
Purified Grade	Silicon....99.70 to 99.90% Iron.........005 to .015%	For applications in non-ferrous industry requiring silicon of high purity.
Low-Calcium Grade	Silicon..........min. 97% Iron.............max. 1% Calcium.......max. 0.10%	For the production of high-silicon aluminum alloys where calcium is detrimental.
Low-Aluminum Grade	Silicon..........min. 98% Iron.............max. 1% Aluminum.....max. 0.10%	For the production of silicon-copper alloys where aluminum is detrimental.
"SMZ" Alloy	Silicon.........60 to 65% Manganese..... 5 to 7% Zirconium...... 5 to 7%	Particularly strong graphitizing inoculant used in making ladle additions to cast iron.
Special Graphitizer	Ferrosilicon Compound	Acts as both deoxidizer and graphitizer in cast iron. Useful in controlling chilling tendencies.
Magnesium-Ferrosilicon	Silicon.......approx. 46% Magnesium..approx. 8.5%	For ladle addition to cast iron to obtain special properties.
Barium-Silicon	Barium.........40 to 50% Silicon.........45 to 55%	For deoxidation of non-ferrous alloys.
"EM" Silicon Briquets (Cylindrical Shape)		For adding silicon to cast iron in the cupola.
Large Size	Silicon..............2 lb. Total Weight.........5 lb.	
Small Size	Silicon..............1 lb. Total Weight.......2½ lb.	

"Electromet," "EM," "Silcaz," "SM," and "SMZ," are trade-marks of Union Carbide and Carbon Corporation.

TITANIUM ALLOYS

PRODUCT *	NOMINAL COMPOSITION	USES
Ferrotitanium	Titanium......27 to 32% Carbon.......max 0.10%	For adding titanium to stabilized austenitic chromium-nickel stainless steels and to high-temperature metals.
Silicon-Titanium	Titanium.......40 to 50% Silicon.........45 to 50% Iron.............max. 3%	For additions of titanium to steels or non-ferrous alloys.
Manganese-Nickel-Titanium	Titanium.......43 to 48% Nickel.......approx. 25% Manganese......max. 8% Aluminum.......max. 18% Iron............max. 5%	Deoxidization of nickel alloys.

TUNGSTEN ALLOYS

PRODUCT *	NOMINAL COMPOSITION	USES
Ferrotungsten	Conforming to A.S.T.M. Spec. A 144-39	For production of tool and die steels; also high-temperature alloys.
Tungsten Metal Powder		Production of tungsten steels and cast tungsten carbide.
Melting Grade	Tungsten.....min. 98.80% Total Carbon..max. 0.25%	
Calcium Tungstate Nuggets	Tungstic Oxide..68 to 72%	For production of tool steels and high-temperature alloys by direct reduction.

VANADIUM ALLOYS

PRODUCT *	NOMINAL COMPOSITION	USES
Ferrovanadium	Vanadium......50 to 55% Carbon....max. 0.20, 0.50, or 3.00% Silicon....max. 1.50, 2.00, or 8%	Production of tool and engineering steels, high-strength structural steels, non-aging rimming steels, and wear-resistant irons.
Vanadium Oxide Fused	V_2O_5...........86 to 89% Na_2O........approx. 10% CaO..........approx. 2%	For addition of vanadium to steel and for manufacturing catalysts.
Sodium Polyvanadate (Red Cake)	V_2O_5.........approx. 85% Na_2O.........approx. 9% CaO..........approx. 2% H_2O.........approx. 2.5%	For manufacture of vanadium compounds, including vanadium catalysts.
High-Purity	V_2O_5......approx. 99.50%	
Ammonium Metavanadate	NH_4VO_3.........min. 99%	

ZIRCONIUM ALLOYS

PRODUCT *	NOMINAL COMPOSITION	USES
12 to 15% Zirconium Alloy	Zirconium.. . .12 to 15% Silicon.........39 to 43% Carbon........max. 0.20%	This zirconium alloy is a powerful deoxidizer. It also increases depth of hardening.
35 to 40% Zirconium Alloy	Zirconium......35 to 40% Silicon.........47 to 52% Carbon.......max. 0.50%	Deoxidizer for fine grades of alloy steels. Used for adding larger amounts of zirconium.
Nickel-Zirconium	Zirconium......25 to 30% Nickel..........40 to 50% Aluminum....approx. 15% Silicon.........max. 10% Iron............max 5%	Effective for deoxidizing and degasifying nickel and its alloys.

IF YOU HAVE A METALS PROBLEM

More than 50 different alloys and metals are produced by ELECTROMET in hundreds of varying compositions and sizes. If you need help in selecting the proper alloys, or have some specific metallurgical problem, be sure to consult one of ELECTROMET'S specially trained metallurgists and engineers. Address your inquiries to one of the offices listed below.

Birmingham 3, Ala..................Brown-Marx Building
Chicago 1, Ill...................230 N. Michigan Avenue
Cleveland 14, Ohio............Union Commerce Building
Detroit 2, Mich...........6-240 General Motors Building
Los Angeles 58, Calif.. . ...2724 Leonis Boulevard
New York 17, N. Y.................30 East 42nd Street
Pittsburgh 22, Pa....................2207 Oliver Building
San Francisco 6, Calif.... ....22 Battery Street
In Canada: Electro Metallurgical Company of Canada
Limited, Welland, Ontario

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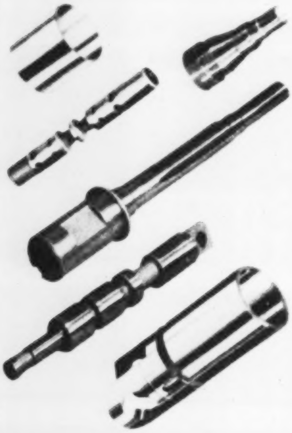

Representative Products

SPLINE SHAFTS—VALVE PLUNGERS—PUMP SHAFTS—ENERGY CELLS (Lanova Type)—CONTROL VALVES — ROTOR SHAFTS — ROTOR LINERS — OUTER RACES — VALVE TAPPET ROLLERS

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Perfection Steel Body Company
Hercules Steel Products Corporation

For 25 years we have specialized in the manufacture of hardened and ground screw machine products. This specialization has taught us much and has enabled us to build a group of experienced personnel that is ready and willing to produce this type of product for you. We have concentrated on maintaining high quality standards and have the latest, most modern equipment for production. These years of specialization have resulted in the creation of many unique facilities for efficient, economical and rapid production in straight line operation which result in benefits to you through precision production.

OTTAWA STEEL PRODUCTS INC. OSP

OTTAWA STEEL PRODUCTS, INC.
GRAND HAVEN, MICHIGAN

ticularly well suited as grid metal in storage batteries designed for float service. On the other hand, grid metal of this composition is said to be suitable for automotive type battery application.

"In the automotive battery field several new alloys have been developed and recently placed on the market which are believed to offer substantially longer periods of service life than the lead grid alloys heretofore used. Said to increase the life of the positive grid about 100 per cent, one of the new alloys is a low antimonial lead containing fractional percentages of copper, tellurium and silver.

"In the lead fabricating field use of bonded lead, that is, a layer of lead bonded integrally to steel, has found wider and enthusiastic acceptance in the chemical process industries where lead's excellent corrosion resistance is used to advantage. Of interest in this field is an automatic lead welding or "burning". machine recently patented. This machine is capable of duplicating the intricate movements of the lead burner in welding a flat seam on lead sheets or bonding lead to steel."

Mr. Chipman:

"GROWING shortage of manpower, not of materials, is the real limitation on what this country can accomplish. Most acute shortage is technically trained manpower.

"Number of students enrolled in our colleges in science and engineering has undergone a sharp decrease and even more drastic decreases appear inevitable in the near future. Five years ago a competent board of experts estimated that the engineering colleges would be able to catch up with the demand by about 1952. This was predicated on an expected output of 25,000 graduates per year.

"Several things have happened to make this estimate entirely obsolete. The number of engineering graduates rose during the 'G. I. bulge' to a maximum of 54,000 in 1949-50 and fell to 35,000 in '50-'51. The fact that even this greatly increased output has not succeeded in filling the need is due in large

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EXCLUSIVE MEAD DESIGN ASSURES TROUBLE-FREE OPERATION

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SINGLE ACTING
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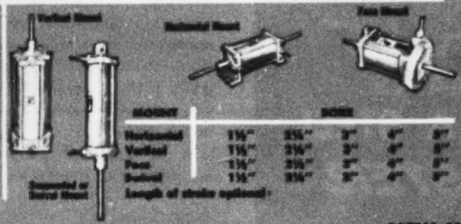
Model V-25
Model V-18
Model V-12
Model H-18-3
Model H-122
Model H-82

BORE	HORIZONTAL STROKES	VERTICAL STROKES
1"	⅝"	⅝"
2½"	1" 2" 3"	1" 2"
3"		½" 2"
4"	2" 2½"	2"
5"	2"	2"
6"	2"	2"

DOUBLE ACTING
Delivery in a few days


Vertical Mount
Horizontal Mount
Face Mount
Suspended or Swivel Mount

MOUNT	BORE				
Horizontal	1½"	2½"	3"	4"	5"
Vertical	1½"	2½"	3"	4"	5"
Face	1½"	2½"	3"	4"	5"
Swivel	1½"	2½"	3"	4"	5"

Length of stroke optional.

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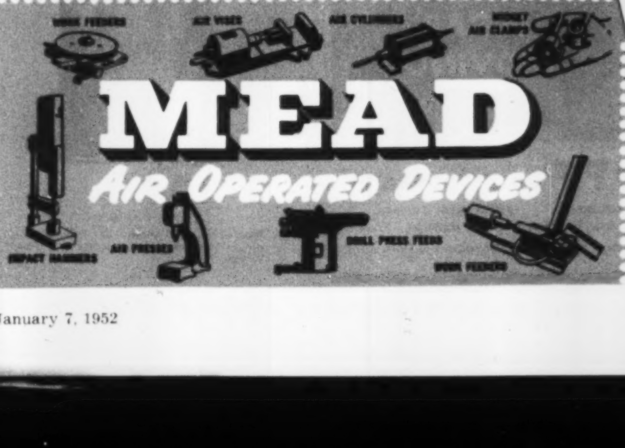
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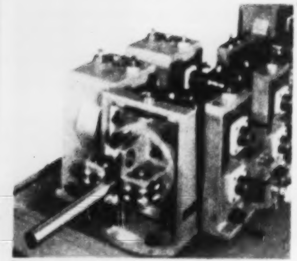

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measure to the sharp rise in demand following Korea.

This demand appears to be still rising while the output is declining drastically. It is estimated that some 24,000 engineers will be graduated in 1952. The most optimistic estimates indicate that the number of graduates in 1954 will be about 17,000, but a more realistic figure would be about 13,000.

"Number of graduates in metallurgical engineering has gone up and down in proportion to the total number of engineers. The number now enrolled in all departments of metallurgy include 754 seniors, 656 juniors. Viewed against the strong and persistent demand for metallurgical graduates this is a small number of candidates for the many jobs needing men.

"Vast opportunities open to students in the engineering field should be brought more forcefully to the attention of a greater number of students. This is a slow task but one in which everyone can help."

Mr. Wheat:

"REMINGTON Arms' efforts to accomplish the dual purpose of civilian and military production are toward a minimum use of critical materials at a maximum production efficiency. To reach these goals with reasonable effectiveness, two major phases of activity are being followed: (1) Full utilization of material properties with assignment of design safety factors

JOHN CHIPMAN
Massachusetts Institute of Technology, pres., American Society for Metals, Cambridge, Mass.

it works out the same every time

Every time on every application the power drive that is the best is the one that gives you the RIGHT horsepower, the RIGHT shaft speed and RIGHT where you need it . . . all combined into one compact power package.

Don't put up with makeshift assemblies when it's so easy to get a unit that's just right for each job.

Master Motors, available in thousands and thousands of types and ratings (up to 150 HP), give you an enormous selection of units designed so that they easily combine to give you a power drive that will add greatly to the compactness, safety and economy of each job. Open, enclosed, splash proof, fan cooled, explosion proof . . . horizontal or vertical . . . for all phases, voltages and frequencies . . . in single speed, multi-speed and variable speed types . . . with or without flanges or other special features . . . with 5 types of gear reduction up to 432 to 1 ratio . . . with electric brakes . . . with mechanical variable speed units . . . and for every type of mounting . . . Master has them all and so can be completely impartial in helping you select the one best motor drive for YOU.

Select the RIGHT power drive from Master's broad line and you can increase the saleability of your motor driven products . . . improve the economy and productivity of your plant equipment.

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the **RIGHT** horsepower
100 horsepower and smaller sizes

the **RIGHT** shaft speed
Gear reduction ratios up to 432 to 1

and **RIGHT** where you want it

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Faster—Just one simple dip, 10 seconds or only two minutes, depending upon your finishing specifications. No sealing dip, no special drying.

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Corrosion Resistance—Up to 1,000 hours salt spray on wrought stock, 250 hours on castings. Approved under government specifications.

Abrasion Resistance—Will not flake or peel from buffing, bending or scraping.

Paint Base—Blocks underfilm corrosion; grips paint, holds it firmly.

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Conductivity—Offers low surface resistance to electrical current.

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Comparative figures show that Iridite Al-Coat saves as much as 50% over other aluminum finishing processes. *Let us prove this to you.*

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for Corrosion Resistance and Paint Systems for Non-Ferrous Metals; ARP Plating Chemicals.

as research knowledge of materials becomes available; and (2) conservation of materials.

"Outstanding in the category of material utilization is the use of powder metal fabricating techniques, cold heading, stamping, die and precision casting. Each of these processes inherently uses less material than machining methods. This trend is normal but has been greatly accelerated, as it must be."

E. K. WHEAT, supervisor, Engineering Arms Tech Div., Remington Arms Co., Ilion, N. Y.

Mr. Lubker:

"RESEARCH on materials and processes of present or potential use to the defense effort and industrial interest in scientific methods for meeting defense problems highlighted the past year at Armour Research Foundation. Volume of investment by sponsors of metallurgical projects alone increased from $706,000 in 1950 to $780,000 in 1951.

"Current projects include studies of alloy steels under impact loading, the development of vanadium base alloys, development of high temperature thermocouples, welding aluminum by recrystallization techniques.

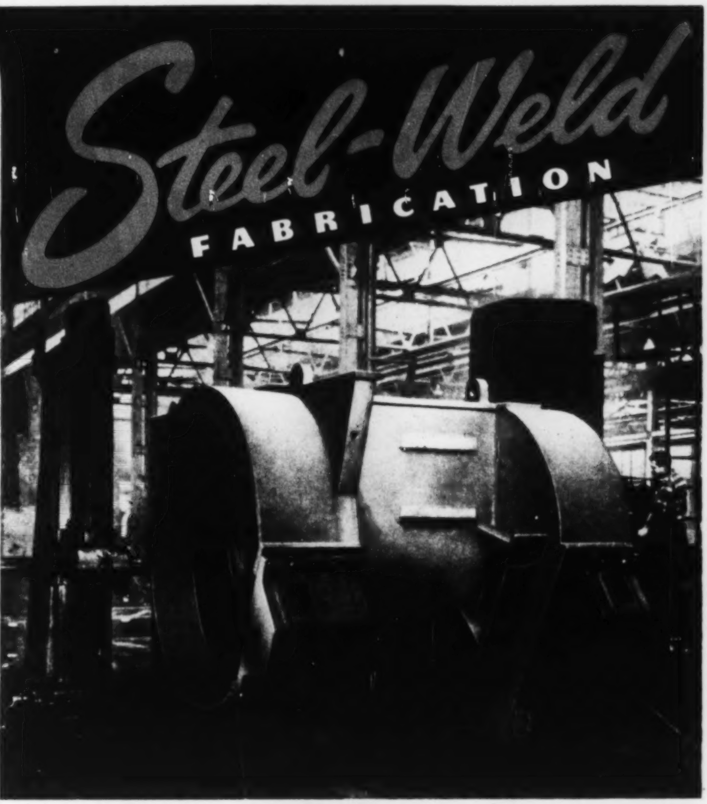
"Titanium-aluminum, titanium-oxygen, and titanium-iron-chromium phase diagrams have recently been determined. Work has begun on additional titanium and zirconium phase systems, plating other metals on titanium, and surface hardening, casting, and joining of titanium. A recent symposium on analysis and metallography of titanium, sponsored by the Foundation, gave evidence of broad interest in this field."

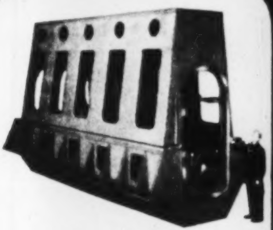
R. A. LUBKER, ass't chairman, metals research, Armour Research Foundation, Chicago

Mr. Klement:

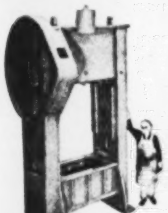
"SHORTAGES, limitations, substitutions—for the second time in a decade, industry is again confronted with a lack of vital materials for both civilian and defense production. This time, nickel appears

Steel-Weld FABRICATION





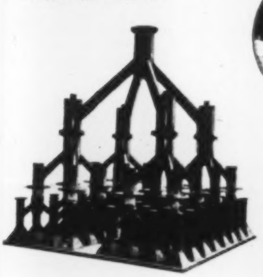
Crank Cases Frames and other Parts for Manufacturers of Marine Steam Engines of Uniflow or Multiple Expansion Type



Heavy Press and Machine Frames and Bases for the Machine Tool Industry

Diesel Engine Crank Cases and Frames for the Marine and Electro-Motive Field

Pressure Vessels for the Chemical and Allied Industries



One of Several Parts of a Catalytic Cracking Plant Produced for the Petroleum Industry.

Use WELDED STEEL for Greater Strength with Less Weight!

The massive crown for a 1000 ton press illustrated above was steel-weld fabricated and completely machined by Mahon for a manufacturer of heavy presses. The complexity of design and the finished appearance of this cumbersome piece tells a story of skillful production technique and fine workmanship . . . it is typical of thousands of parts and assemblies produced by Mahon for manufacturers throughout the country. If saving in time or production costs can be effected in your manufacturing operations through Steel-Weld Fabrication, it will pay you to investigate the facilities and technical services of the Mahon Company. You will find an unique source with complete, modern fabricating, machining and handling facilities to cope with any type of work regardless of size or weight . . . a source where skillful designing and advanced fabricating technique are supplemented by craftsmanship which assures you a smoother, finer appearing job, embodying every advantage of Steel-Weld Fabrication.

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to be in shortest supply of any of the commonly used nonferrous metals.

"Substitutions for nickel-base and nickel-bearing alloys are sometimes difficult to find. This is particularly true in the corrosion field. The problem is even more complex when temperatures higher than room temperature are being considered.

"Substitutions of alpha aluminum bronzes for some of the high nickel-bearing alloys are being made with worthwhile results. Use of aluminum bronze on corrosion applications where conditions are reducing seems to be feasible at temperatures up to 500° F.

J. F. KLEMENT, chief metallurgist, Ampco Metal Inc., Milwaukee, Wis.

Mr. Nelson:

"ACTIVATION of government-owned magnesium plants is necessary to supply magnesium demand. Increased usage of magnesium sheet on aircraft structures, brought about by improved design and fabrication technology, improved protection and techniques for insulating dissimilar metal joints, has lead to a shortage of thin sheet.

"This cannot be adequately relieved until the new continuous coil-rolling facilities now being installed at Madison, Ill., come into production in late 1952 or 1953.

"Press-forged magnesium mortar bases, now in production, represent

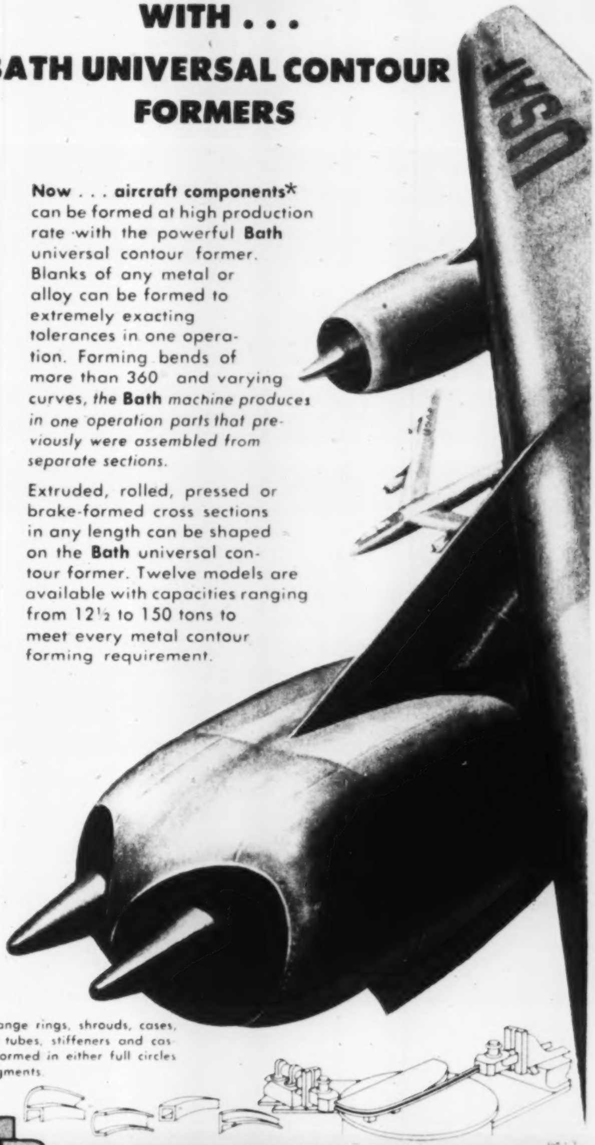
C. E. NELSON

technical director, magnesium div., Dow Chemical Co., Midland, Mich.

STRETCH-FORM

FOR STRENGTH AND PRODUCTION WITH . . .

BATH UNIVERSAL CONTOUR FORMERS



Now . . . aircraft components* can be formed at high production rate with the powerful **Bath** universal contour former. Blanks of any metal or alloy can be formed to extremely exacting tolerances in one operation. Forming bends of more than 360° and varying curves, *the* **Bath** *machine produces in one operation parts that previously were assembled from separate sections.*

Extruded, rolled, pressed or brake-formed cross sections in any length can be shaped on the **Bath** universal contour former. Twelve models are available with capacities ranging from 12½ to 150 tons to meet every metal contour forming requirement.

*Jet flange rings, shrouds, cases, flame tubes, stiffeners and casings formed in either full circles or segments.

CB THE CYRIL BATH COMPANY

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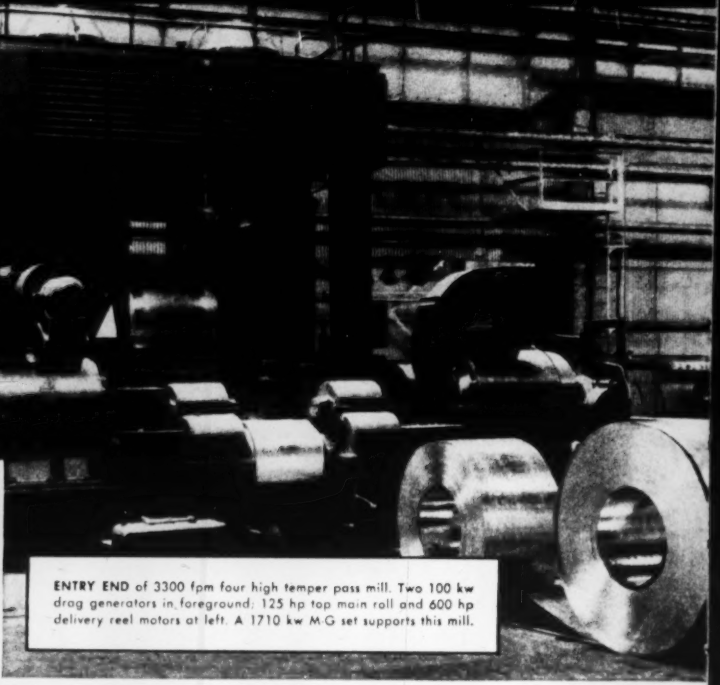
They Just Keep

SOUTHERN STEEL PLANT TEMPER

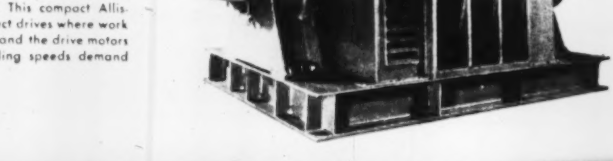


ENTRY END of 3300 fpm four high temper pass mill. Two 100 kw drag generators in foreground; 125 hp top main roll and 600 hp delivery reel motors at left. A 1710 kw M-G set supports this mill.

DELIVERY END of four high temper pass mill. Notice the two large, high visibility dials of the Screwdown Indicator. This Direct Current Remote Indicating device gives a constant, accurate indication of roll setting and strip thickness. The Screwdown Indicator is equipped with a remote reset to enable calibration of the roll setting directly from the operator's position.

ROLLING ALONG STEADILY, producing quality sheet and coil strip, the above four high temper pass mill has broken tonnage records at the largest southern steel plant.

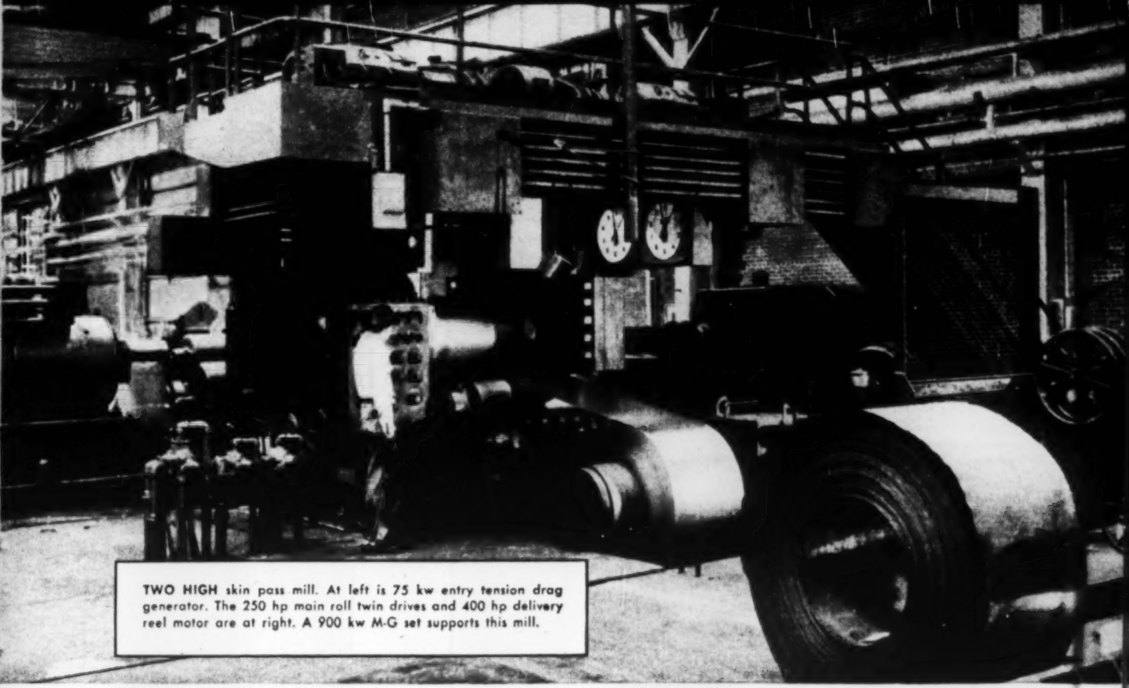
Five two stand, four high tandem temper mills — driven, supported and controlled by Allis-Chalmers—were installed here in 1938. Having regularly delivered quality tinplate production beyond rated capacity, their performance and



TOP (125 hp) **AND BOTTOM** (1125 hp) main roll drive motors for the four high temper pass mill. Note small diameter of the top drive motor. This compact Allis-Chalmers design is valuable in direct drives where work rolls are small, drive shafts large, and the drive motors placed close together. Higher rolling speeds demand smaller diameter motors.

Rolling Along!

MILLS EXCEED CAPACITY TONNAGES



TWO HIGH skin pass mill. At left is 75 kw entry tension drag generator. The 250 hp main roll twin drives and 400 hp delivery reel motor are at right. A 900 kw M-G set supports this mill.

maintenance record was considered by the steel plant when ordering the two new temper mills shown on these pages.

Both New Mills Allis-Chalmers Equipped

Allis-Chalmers supplied the electrical equipment driving, supporting and controlling *both* the four high and the two high temper mills shown here. Auxiliary drives and controls — for roller leveller, hydraulic systems, conveyors, entry ramps, etc. — also were supplied by A-C. The rolling mills themselves were built by the E. W. Bliss Company.

The individual generator system of support and control is used for both these mills, making them so flexible that they can roll from 30 to 13 gauge, 20 to 48 in. wide. The two high temper mill can roll both coil and cut-to-length sheets. Also, the two high temper mill main rolls have a twin drive with two identical motors, making it unnecessary to grind the work rolls to identical diameters, since variations can be compensated for in the control.

Regulex Exciters Give Automatic Control

Variable voltage dc control is employed in both mills. Wide use is made of *Regulex* rotating amplifier exciters to control tension, reel buildup, and speed matching, as well as the supporting M-G sets. This refined system, giving automatic control of so many critical factors, enables these temper mills to finish roll to exacting quality standards at capacity and above tonnages.

To date, Allis-Chalmers has supplied the drive and control for *forty-five* temper mills, one of the more recent developments in steel rolling. Consult with a pioneer and leader in the application of electric power in the iron and steel industry. *Your* conversion or expansion program also can have reliable Allis-Chalmers electrical equipment. For more information, call your nearest A-C office or write to Allis-Chalmers, Milwaukee 1, Wisconsin.

A-3367

Regulex is an Allis-Chalmers trademark.

ALLIS-CHALMERS

A-C ALLIS-CHALMERS

POWER, ELECTRICAL, PROCESSING EQUIPMENT FOR IRON AND STEEL

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Layne offers you the right combination of unmatched experience plus modern equipment for installing well water supply units of any size—and for any purpose. Layne has made more water supply installations than any other firm in the entire world, and this valuable experience places Layne in a position to unquestionably do every job exactly right. Once the installations have been made, a complete record of everything is kept: strata formation, sand, porosity, casing details, sand screen length, diameter and metal used, all pump information including bearings, shafting, impellers and operating characteristics. With such information, Layne is always in a position to give quick and most economical service for adjustments or repairs if and when needed.

Everything by Layne

Layne accepts your contract for furnishing everything: Layne supervision, Layne drill crews, Layne drill equipment, Layne designed and Layne built louver type sand screen and Layne high efficiency vertical turbine pumps. No other firm is involved, therefore there is no divided responsibility. This plan gives you the very finest well water supply units that world wide experience and skill can build.

Layne offers a wide range of fully illustrated catalogs covering all phases of well water installations for all types of industry. Write for more information to

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General Offices, Memphis 8, Tenn.

Layne
WATER SUPPLY
WELLS & PUMPS

one of the largest magnesium forging developments in point of total poundage and weight of parts."

Mr. Gosnell:

"CRITICAL procurement conditions, make it necessary frequently to substitute in the fabrication of corrosion-resistant processing equipment. Many of these materials are difficult to obtain even with extended delivery. Examples are nickel, Monel, Inconel and corresponding clad steels.

"Material substitutions must be made with minimum effect upon life of equipment and quality of product. For some applications, stainless steels can be substituted, particularly the controlled carbon grades of types 304 and 316. Straight chrome steels are also used in some cases where corrosion attack is not especially severe. Obtaining accessory parts of same material composition may present serious problems."

Mr. Roberts:

"DURING the last ten years, and particularly in the last five years, greater attention has been paid to the use of high carbon and high-vanadium-containing high speed steels, known as super-high speed steels because of their superior cutting qualities and extremely high wear resistance. One such material, Vasco Supreme, developed prior to World War II, but because of alloy

E. C. GOSNELL
vice president, Colonial Iron Works, Cleveland

from STEEL
to STEERS!

Regardless of your need, there is a special "Old Faithful" marker just for YOU . . . A century of crayon experience and "know-how" goes into the making of every OLD FAITHFUL and AMERICAN marker. This is your assurance that "When Identification Counts —You can Count on OLD FAITHFUL"!

There's a special AMERICAN MARKER to fit your need!

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J&L STEEL

THIS MAN'S LOOKING FOR SCRAPPERS!

HE'LL BE SEEING *YOU!*

Be Ready for Your District's Scrap Representative!

The big fight's on to lick the scrap shortage!

The shortage is so critical that many steel plants have only a few days scrap on hand.

Get in the fight! Get in the scrap!

The steel industry has mobilized to go out and get desperately needed scrap. Scrap representatives have been appointed in your district. One will call on you soon.

Welcome him . . . be ready for him. Survey your plant *before* he comes so you can tell him how much scrap you can move . . . *or have already moved* . . . to the mills through your scrap dealer.

HERE'S WHAT'S WANTED

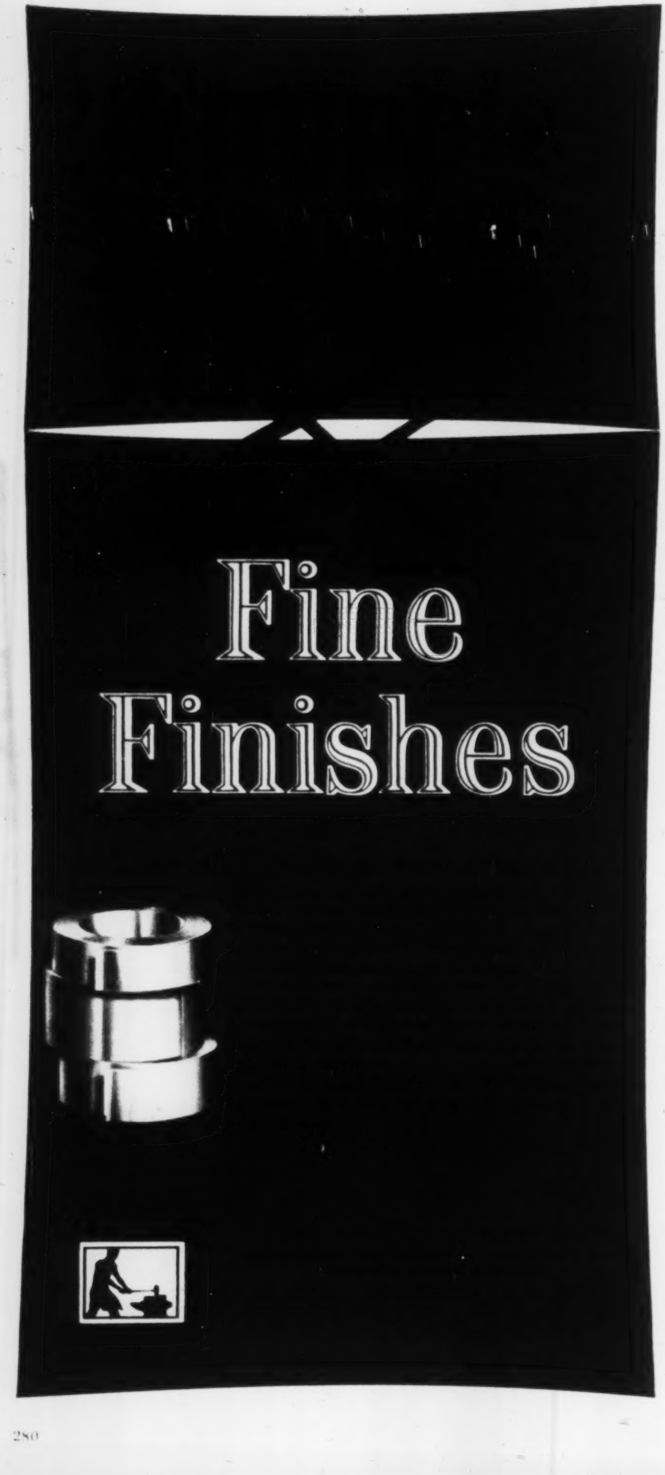
Steel mills need tons and tons of scrap over and above "working scrap" which you normally sell. Broken or obsolete machinery and equipment . . . odds and ends . . . rails . . . worn out parts—in fact *all* the iron or steel material that's gathering dust in your plant.

Put a responsible man in charge of rounding up scrap in your plant. *Do it now.* Unless dwindling scrap piles are replenished *immediately* steel production will suffer *immediately.*

SCRAPPY SAYS:
AID DEFENSE
MORE SCRAP
TODAY...
MORE STEEL
TOMORROW

Be a Scrapper for Steel... FOR AMERICA

JONES & LAUGHLIN STEEL CORPORATION
PITTSBURGH 30, PA.



shortages not introduced until 1946, had, in addition to 12 per cent tungsten, 4 chromium and 5 cobalt, a carbon content of 1.55 and 5 per cent vanadium.

"Severe restrictions placed on the use of tungsten in high speed steels, made it necessary to cut manufacture and use of steels containing 6.75 per cent tungsten.

"To continue to provide industry with a steel having the superior cutting qualities and wear resistance, Vasco Supreme A was developed in which 3.00 per cent molybdenum was substituted for a portion of the tungsten in the steel mentioned above."

GEORGE A. ROBERTS, chief metallurgist, Vanadium-Alloys Steel Co., Latrobe, Pa.

Mr. Boynton:

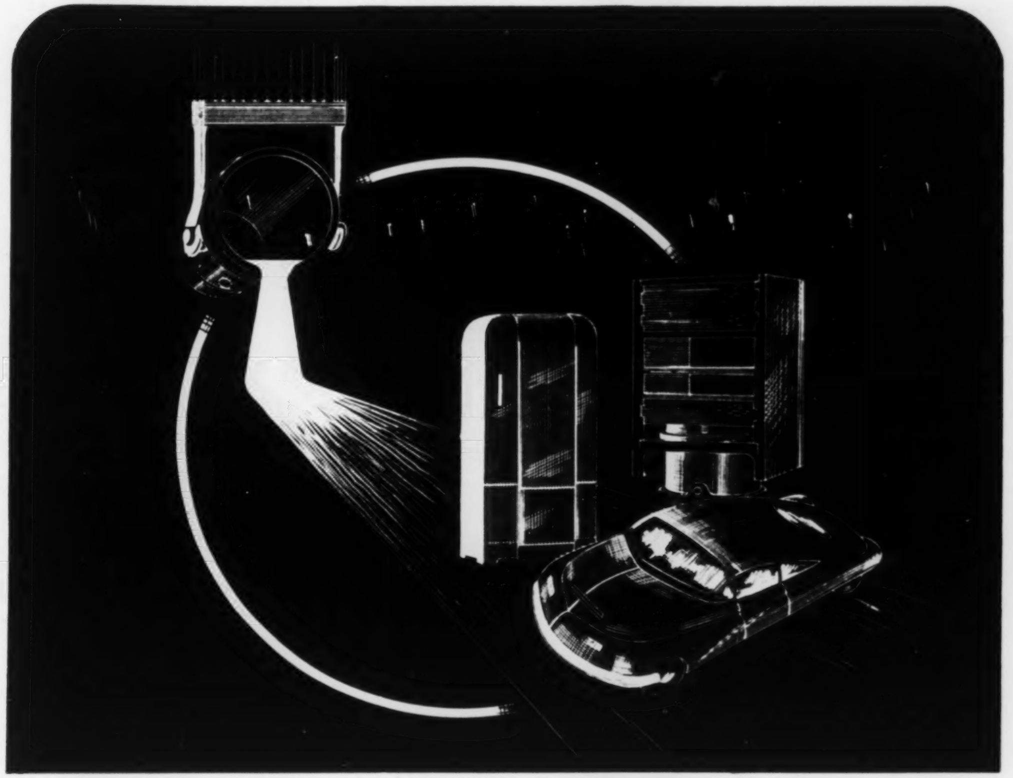
"RARE metals are fast coming to the front of the world stage, probably due to the urge imparted to the metallurgist to find substitutes for some of the rapidly diminishing commoner ones.

"Tungsten for example is being used faster than it can be processed and purified; chromium and nickel also are in short supply and are termed 'strategic.' Lastly but not least, is the fact that steel, the commonest of all metals, cannot be produced indefinitely at an ever-increasing rate.

Spurred on by the aircraft makers, there is a constantly increasing demand for stronger and lighter metals. Heading the list is the

HENRY C. BOYNTON

consulting met., Research Institute of Temple University, Trenton, N. J.



SINCE 1850

THE STEEL INDUSTRY

in its advance to a position of pre-eminence in the world of metals, has been paced by the production and transportation of the necessary ores. The Cliffs organization is geared to meet the ore needs of the future as adequately as it has met those of the past ninety-eight years.

LAKE SUPERIOR IRON ORE • FERRO ALLOYS
VESSEL TRANSPORTATION • COAL

THE Cleveland-Cliffs IRON COMPANY
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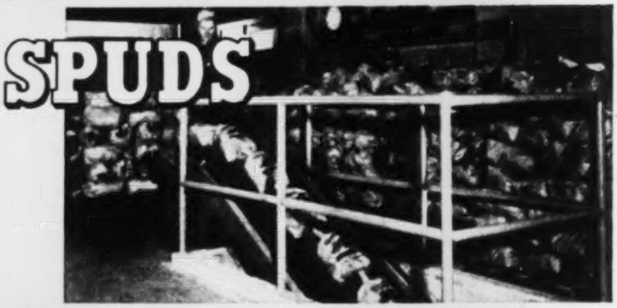

Whatever you make or handle, Standard Conveyors speed operations . . . save time and costs . . .

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UTILITY BELT-VEYOR • HANDI-DRIVE
VERTICAL LIFTS • PNEUMATIC TUBE SYSTEMS

'miracle' metal titanium whose users are zooming along at a rate that bids fair, to rival aluminum.

"At least three giant companies and several smaller, are spending millions to 'lick' titanium's problems, and in spite of all handicaps, are producing in the U.S. about 700 tons of metallic Ti this year and hope by the close of 1952 to boost the output to 5000 tons or more. Metallurgists now feel sure that as production rises, costs will come down."

Mr. Spicacci:

"A DECIDED increase in demand for ball bearings for military use will tax the capacity of bearing plants. Civilian consumption will naturally feel the pinch since the allotment of material for such purposes will be curtailed.

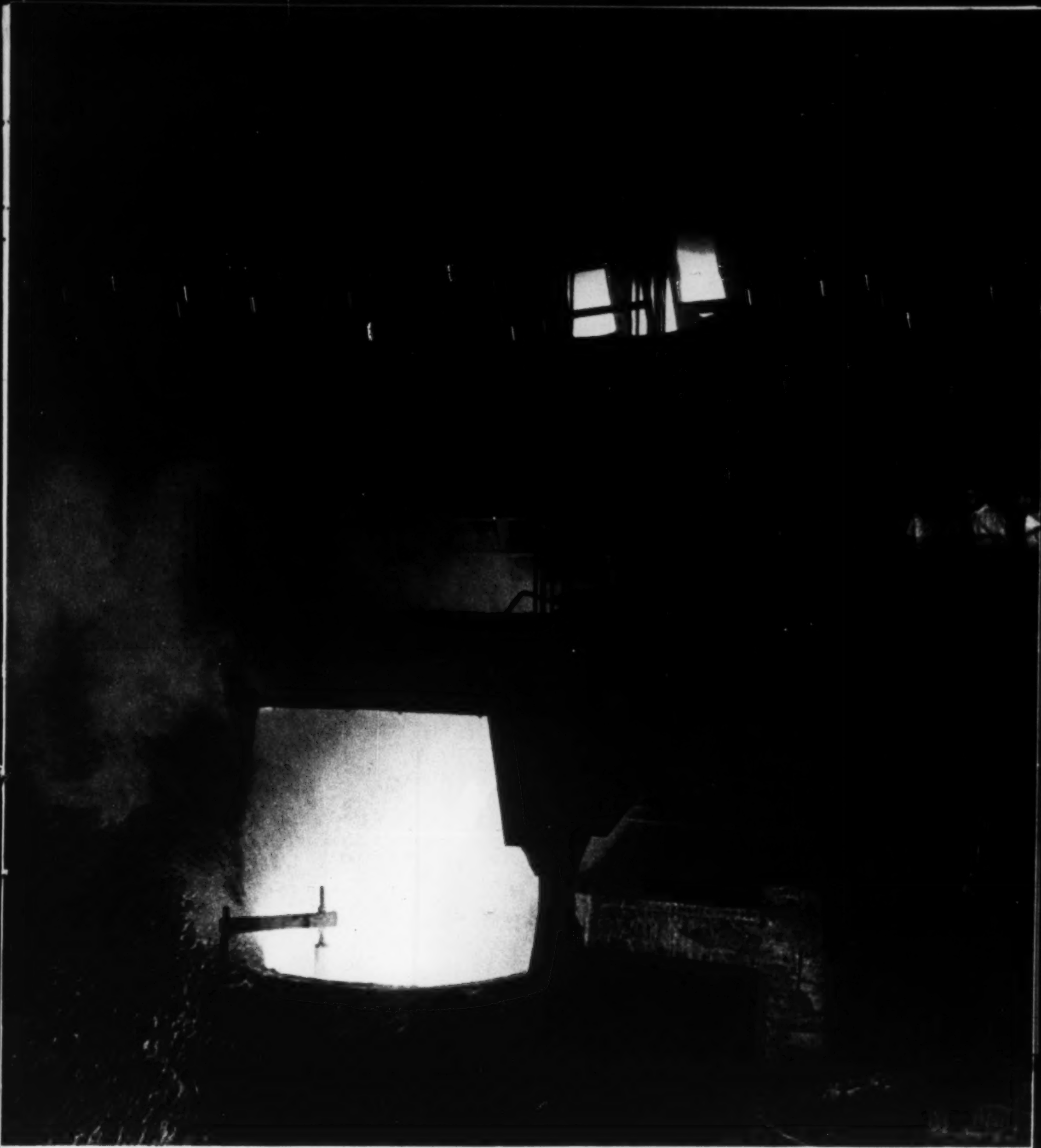
"Some concerns have been able to obtain steels from European sources. Although the amount obtained abroad has been not very significant, the European armament program will deprive manufacturers of this source in 1952.

"Main constituent alloy element for bearing steels is chromium. Fortunately, chromium shortage is not as serious as many other elements used in steel alloy. We have been able to maintain the high standards of quality of 52100 steels—the steel used in ball bearings. No one seems to know whether chromium will be more critical in the near future. Most of the bearing companies are cooperating with steel suppliers to find a satisfactory substitute if and when such shortage becomes a reality. Effect of boron on hardenability of steels may be very pronounced in low carbon steels, but its effect on 52100 steels cannot be great."

A. R. SPICACCI, chief engineer, Bearings Co. of America, Lancaster, Pa.

Mr. Frischman:

"AS industry changes over to more widespread use of leaner alloy type boron-treated steels, the question of case hardenability frequently arises. Reports from users indi-



McLOUTH STEEL
CORPORATION
DETROIT AND TRENTON, MICHIGAN

MANUFACTURERS OF
HOT and COLD ROLLED
STAINLESS and CARBON
SHEET and STRIP STEEL

Valve castings by Walworth Company, South Boston, Mass. Casting at left is from a "C" Process shell mold. Note smooth-surface compared with conventional casting at right.

COSTS SKID ON SMOOTH CASTINGS

Casting 2-inch valve bodies like the one above at left with thin-shell sand molds made by the Croning Process—saves Walworth Company at least 5 per cent in the amount of metal poured.

Bonded with BAKELITE Phenolic Resins, thin-shell molds and cores for ferrous and non-ferrous casting bring other important savings compared with the use of conventional green sand molds. Almost pattern smooth castings, with tolerances as close as .003 to .004 inches per inch, cut down finishing time. And since the molds permit venting of gases more thoroughly during pouring, rejects are reduced to a minimum.

Other advantages:

- Molds and cores can be baked in 30 seconds to two minutes—in quantity with uniform quality.
- Built-in dowel pins and holes assure accurate registration of mold parts.
- Dimensionally stable, moisture-resistant molds and cores can be stored for long periods.
- Light weight, less handling fatigue.

Investigate this remarkable process. Your foundry will know about it. You will find that designing your products with this process in mind can speed production, lower costs, conserve metal, even eliminate serious production bottlenecks. For further facts, write Dept DD-43.

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PHENOLIC
BONDING RESINS

TRADE MARK

BAKELITE COMPANY
A Division of
Union Carbide and Carbon Corporation
30 East 42nd Street, New York 17, N. Y.

cate highest and most uniform surface hardness is obtained upon direct quenching from the carburizer as compared with the cooldown, reheat and quench treatment. Some have associated this difference in behavior to the presence of boron; but, in the light of our case hardenability experiments, it appears that this is not so.

"By carburizing standard Jominy-end-quench hardenability specimens, the response of four different steels was investigated. These steels were AISI types 4817 (3½ per cent nickel-molybdenum), 6120 (chrome-vanadium), 8620 (chrome-nickel-molybendum), and 94B17 (chrome - nickel - molybdenum - boron), carburized above eutectoid carbon content but not exceeding 1.10 per cent surface carbon. Duplicate test specimens for the experiment were run simultaneously through large continuous type carburizing furnaces, one employing gas, the other solid compound.

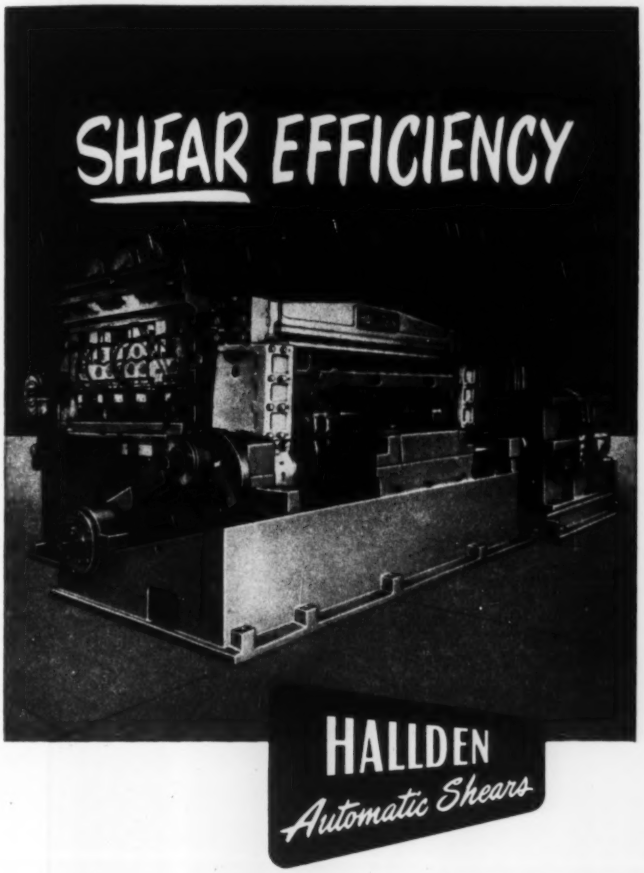
"Results of these tests showed case hardenability of 4817 steel to be similar whether direct quenched or reheated. In comparison, the leaner alloy steels 6120, 8620 and 94B17 steel all showed much lower case hardenability."

T. A. FRISCHMAN, chief metallurgist, axle div., Eaton Mfg. Co., Cleveland.

Mr. Zapffe:

"*FRACTOLOGY—The Science and Study of Fracture* is the title of a book which will hit the press in 1952. Fracture of metals has attracted interest since ancient times—by the Greeks and Romans 2000 years ago as a test for steel quality, by Agricola in the 16th Century as a processing control in the making of steel, by Galileo in the 17th Century as a special problem in his study of the strength of materials, and by America in both World Wars of the 20th Century (so far!) where fractures from flakes in forged steel and from a baffling brittleness phenomenon in welded steel plate for ship construction became a serious problem on an international scale."

CARL A. ZAPFFE, consulting metallurgist, Baltimore.



Hallden Machines are designed to give modern steel mills maximum efficiency in flattening and cutting off operations. They permit continuous feed of metal through the machine at accelerated speeds while maintaining precision cutting accuracy. Low center of gravity, rugged construction and compactness assure uninterrupted operation. Remember, too, that Hallden Shears are completely automatic.

Take *your* shearing problems to Hallden, the *shearing specialists.*

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Our estimating and design engineers will analyze your broaching jobs, present or proposed, and give you actual cost and production data on new tooling . . . you know your savings beforehand.

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Every size and type of broach is manufactured in our modern plant. Highest standards of quality are assured through specialized equipment and processes from roughing operations through final inspection.

SERVICE
Detroit Broach field engineers are prompt to give you help when needed on broaching jobs in your plant. We also will setup and tryout your new broach tooling . . . thus assuring most efficient production.

Detroit Broach Company has always designed and built broach tooling exclusively . . . for every type, size and make of broaching machine.

This specialization thoroughly qualifies our engineers to give sound, unbiased recommendations on broaching procedures and tooling . . . it also means more efficient manufacture of broach tooling since our modern plant is equipped and manned specifically for that single purpose. These two factors are extremely important to you because they provide assurance that your broaching problems are in the hands of highly experienced specialists . . . and such specialization *is* necessary to obtain greatest all-round efficiency and economy from broaching applications.

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BROACHES AND BROACH TOOLING EXCLUSIVELY

Processing Methods

● IN READING the comments by the participants in this section of the Forum, it will become pretty clear that improved processing methods are helping industry get out more product faster with relatively less material, even under emergency conditions.

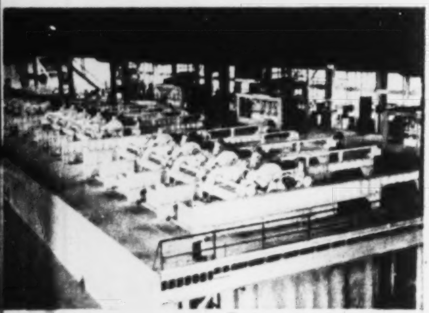
For instance, jet engine makers needed a machine for turning, boring and facing thin wall sections of large diameter and short length. Machine tool builders got busy and designed a T-lathe now in production which also will find many peacetime applications. Tell Berna says new machine tools at the 1947 show were 33 1/3 per cent more efficient and there has been continuing improvement since.

Presses have been designed for faster work cycles, increased pressures and deeper draws. Further work with cold extrusion justifies earlier claims for saving both material and machining time. Forge shops now are set to make forgings of larger mass than the largest ingots available.

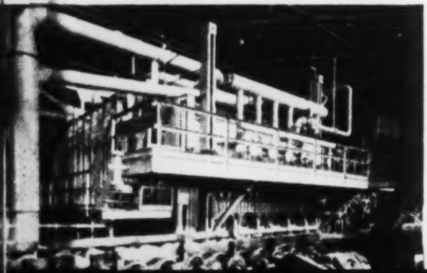
Many heat treating problems, including saving of alloys, can be solved through improved quenching and selection of steels with the minimum hardenability required. One salt bath furnace builder is saving nickel through design of a totally submerged heating system.

WHEN URGENT PRODUCTION SCHEDULES

One-way fired soaking pits.



Slab heating furnaces.



Steel-makers who must increase tonnage and maintain quality, to meet urgent demands, find 'Surface' heating and heat treating equipment superbly suited to their needs.

And here's why: Scores of operating and engineering executives in the metal producing and metal working industries, in cooperation with 'Surface' engineers, helped build 'Surface' equipment. Continuous laboratory research in scientific application of gases, heat and mechanisms to many heating problems have netted improved 'Surface' equipment that *produces*—dependably and economically—year after year. Into each installation goes the know-how accumulated by men who have spent their lives in working in and with the steel industry. Now, when prompt, quality tonnage is vital, 'Surface' offers modern processes and methods that deliver the steel. Write us today.

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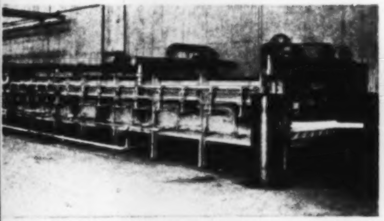
STEIN & ATKINSON, LTD.—LONDON
STEIN & ROUBAIX—PARIS, LIEGE AND GENOA
WILL L. SMITH, S.A.—BUENOS AIRES

'Surface' SERVES THE STEEL INDUSTRY

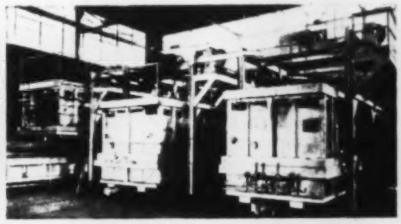
One Way Fired Soaking Pits • Billet Reheating Furnaces • Slab Heating Furnaces • Continuous Type, Controlled Atmosphere Strip Annealing and Normalizing Furnaces • Controlled Atmosphere Annealing Covers for Wire and Rod • Controlled Atmosphere Annealing Covers for Coil and Sheets • Continuous Furnaces for Heat Treatment of Steel Plate • Controlled Atmosphere Furnaces for Carbon Correction in High Alloy Rod and Bar Stock • Continuous Type Bright Annealing and Normalizing Furnaces • Prepared Gas Atmosphere Generating Equipment • Pit Type Convection Furnaces for Rod Annealing • Stress Relief Furnaces • Wire Patenting Furnaces

heat FROM INGOT THROUGH FINISHED PRODUCT

Wire patenting furnaces.

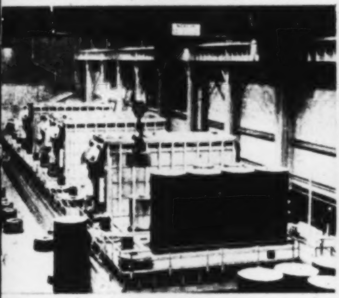


Batch type carbon correction annealing furnaces.



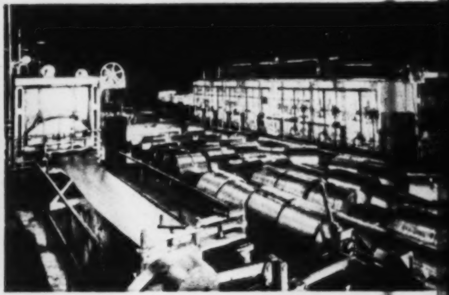
Continuous bright annealing and normalizing furnaces for tubing.

Controlled atmosphere coil annealing covers.

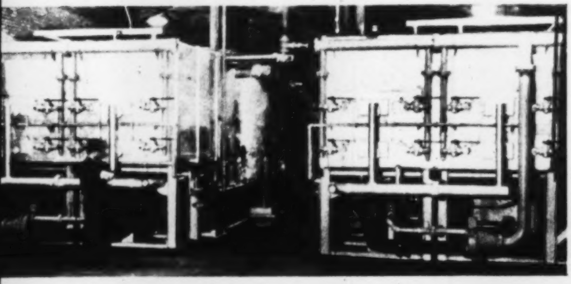


Pit type convection furnaces for rod annealing.

Continuous strip annealing and normalizing furnaces.

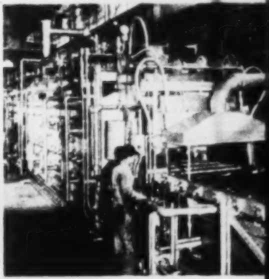


Prepared atmosphere generators.

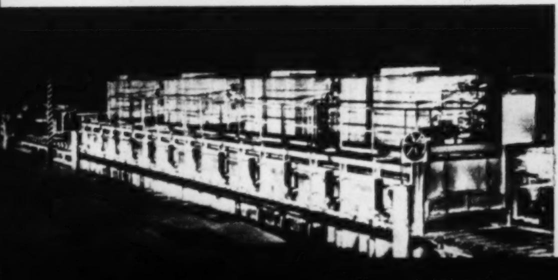


Stress relief furnaces.

Continuous controlled atmosphere annealing furnaces.



Continuous armor plate heat treating furnaces.



Controlled atmosphere wire and rod annealing covers.

"ACCELERATED demand on the metalworking industry from military requirements have been largely responsible for the wide spread acceptance of many new developments in metal forming, particularly in hot forming which includes more conventional forging, as well as newer extrusion techniques. The steam hammer seems to be giving way rapidly to the use of preforming machinery and large presses.

"This newer method not only turns out forging some three times as fast as the hammering method, but also promotes far higher quality in respect to surface conditions, with appreciable savings in steel. The more rapid method of doing the actual forging has, in turn promoted the use of more rapid and better billet heating equipment and modernized handling methods for keeping the forging presses busy. General speed-up of producing forgings has, furthermore, brought forth marked improvement in the heat treating operations following the forming.

"In many instances forgings are transferred immediately to a salt bath where they are cyclic annealed, taking full advantage of the residual heat left in the forgings. The high-temperature salt bath is also becoming more popular as a means of billet heating in the metal forming industry. It is particularly well adapted to the heating of billets for extrusion, which process has further increased the demand for freedom from surface decarburization, scale and grain growth. This rapid method of billet heating will no doubt be a major contributing factor to increasing the possibilities in the extrusion field for the near future."

"1951 saw several interesting developments in the field of metal stamping. Keeping up with other methods of fabrication, we developed the basic methods of cold drawing pure titanium, which, though not yet stamped in any large quantity, has a bright future.

"Mullins Mfg. Co. announced its Koldflo process permitting forward and backward extrusion of round bar steel. This process, and similar developments by Heintz, appear to introduce new horizons for the fields of stampings. This is true not only because of material savings but also because of the high tensile strengths achieved. Another company has extruded shot gun shell cases from square blanks.

"Establishment of a General Components Division within the National Production Authority represents a step forward in recognition of the nature of the business of stampers, forgers, machine shops, foundries and others, and should avoid some of the many problems of previous controls.

"Production in our industry during 1951 has been blocked, first by material shortages and, more recently, by a drop off in orders; experimental quantities of war goods do not justify the tooling necessary for press fabrication. At present there is more than enough capacity within the industry to meet all defense requirements. The present level of operations in most companies could be substantially expanded, if orders from the military were forthcoming. Under such conditions it seems foolish for the armed forces to spend large amounts on new press shops for large prime contractors."

"REARMAMENT brings demand for many items of forgings which were in heavy production just a few short years ago. The industrial expansion that goes with rearmament is responsible for a further demand for open die forgings. So the industry is busy. Facilities are taxed and all tools are fully

"A general awareness exists of the importance of conservation of scarce materials. Attention has been given to substitutions, improved heat treatment and all possible means of conserving alloys while maintaining desired qualities.

"Many open die forgings are large. Sections do not permit liquid quenching or any means of rapid cooling. In forgings of this kind, improvement in mechanical properties is obtained only by alloying elements. It is sometimes difficult or impossible to avoid the use of scarce materials.

"One of the new factors in the present circumstances is the search to determine some further quality not revealed by the tension test, which is obtainable to a degree,

HOWARD E. BOYER

chief metallurgist, American Bosch Corp.
Springfield, Mass

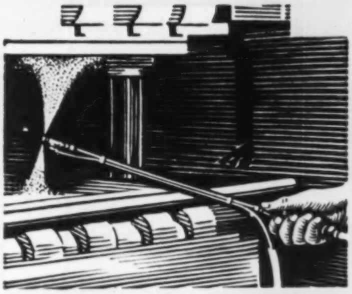
CARTER C. HIGGINS

president & general mgr., Worcester
Pressed Steel Co., Worcester, Mass.

ADOLPH O. SCHAEFER

V.P. in chrg. of engrg. & mfg., Midvale
Co., Philadelphia

NO SMOKE...NO FUMES in Hot Forging with... "dag" Colloidal Graphite



"Dag" colloidal graphite dispersed in water eliminates smoke and fumes in hot forging operations . . . greatly improves working conditions. The lubricating properties of colloidal graphite are superior, too, giving increased production . . . reduced die wear . . . better finish . . . and usually a saving in steel stock.

The uses of **"dag"** colloidal graphite for hot forging operations are fully explained in a specially prepared article entitled "Forging Die Lubrication". Copies are available without obligation. Write today to Acheson Colloids Corporation, Port Huron, Michigan, for Bulletin #750-21A.

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Acheson Colloids Corporation
Port Huron, Mich.
...also Acheson Colloids Limited, London, England

only by notched bar impact testing. Impact testing by present methods has deficiencies and the increasing use of the test introduces more problems than it solves.

"Recent demands on the open die forging industry indicate that problems connected with size may become increasingly important during 1952. Projected equipment requires forgings of larger mass than the largest ingots now designed can provide. A period of new achievements in size alone is probably just beginning."

Mr. Naujoks:

"GREAT increase in size of closed impression dies is the outstanding milestone of progress in the metalworking industry for 1951. Closed impression die drop forgings up to 10,000 pounds are now an actuality. They open the new broad avenue of design possibilities for manufacturers of heavy equipment, where large components now necessarily fabricated from numerous smaller parts are susceptible of substantial improvement.

"Important design advantages now available through this development, are a direct result of the progress that has been made in increasing the size available in contour forgings. 1) A component made in one piece instead of a composite of several pieces; 2) greater uniformity of strength throughout the part; 3) substantial savings in weight; 4) considerable savings in processing and assembly time; 5) elimination of welds with resulting weak areas; 6) improved efficiency.

"Large closed impression die forging incorporates maximum dynamic strength and toughness, homogeneous structure and controlled grain flow, greater density and soundness, improved machinability, and a higher factor of safety. These qualities are necessary to efficiency and economy in large components as well as small ones. Besides aircraft forgings, where maximum strength with minimum weight is the vital factor, large closed impression die forgings will find applications in such fields as marine, mining, petroleum, excavating and heavy equipment."

WALDEMAR NAUJOKS

special projects engineer, Ladish Co., Cudahy, Wis.

Mr. Seabury:

"LABOR of all classes employed by the drop forging industry, is becoming very scarce. A shortage of hammermen and other skilled operators will soon reach the critical stage. Steel in the forms required for closed die forgings remains in short supply; this is especially true with respect to particular sizes and specifications required for current orders. Difficulty in getting the steel firms to accept 1952 allotments gives little encouragement to expect that the situation might get better.

"Die blocks are a critical problem at present, but it is expected that the situation will improve sharply early in 1952. Volume of shipments in tons for 1951 will just about equal the tonnages shipped in the war years of 1943-44, which were the largest tonnages ever produced by this industry. Bookings continue in heavy volume. Average backlog for the drop forging industry at present is six to seven months. Many plants have backlogs extending for much longer periods.

"Some expansion is going on and some is contemplated. There is expansion in heavy hammers under the direction of the Air Force to meet aircraft schedules. There are other scattered expansions for the jet engine program which will require further recruitment of skilled operators."

R. M. SEABURY, Drop Forging Association, Cleveland.

Mr. Smalley:

"MAIN problem of 1951 has been one of increasing production with a shortage of labor. Foremost in this direction has been the extended application of equipment for mechanical handling of materials and production to relieve the indirect labor difficulty. Improved foundry layout and the increased use of lift trucks, pallets, racks, hoppers, conveyors, elevators and sand systems with additional crane facilities have become the order of the day.

"1951 marks revolutionary steps in melting technique that will have a far-reaching influence on the gray iron industry as a whole. The water-cooled cupola, eliminating the use of refractories, bricks and patching, is finding application both here and abroad. It has been demonstrated that by water-cooling the melting zone it is now possible to obtain minimum burn-out and melt longer heats with all the economical and metallurgical advantages resulting from a constant inside cupola diameter.

"Basic lined cupola is helping in the conservation of pig iron, enabling hotter and cleaner melting with inferior coke and lower grade scrap. Basic melted cast iron is a new material, and its physical characteristics and metallurgy are under investigation.

"Application of the Hot Blast Cupola for short heats is now a practical realization, although its economics and advantages await practical evaluation.

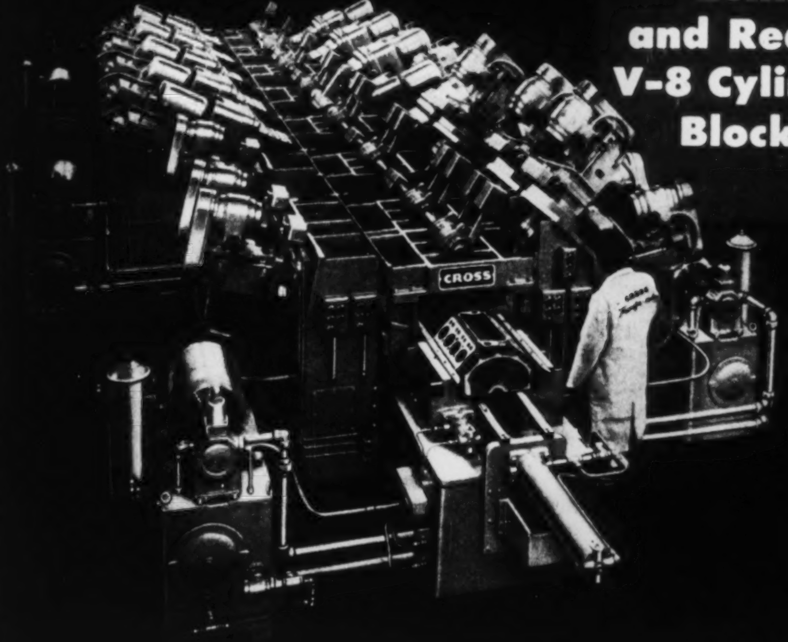
"Meehanite metal has found ex-

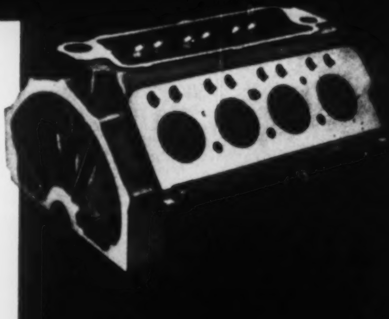
OLIVER SMALLEY

president, Meehanite Research Institute Inc., New Rochelle, N. Y.

Another Transfer-matic by Cross

Drills and Reams V-8 Cylinder Blocks





- ★ Drills and reams dipstick hole; drills oil feed holes for heads; rough and finish reams tappet holes on 82 cylinder blocks per hour at 100% efficiency.
- ★ 15 stations: one loading, three drilling, four reaming, one cleaning and six inspection.
- ★ Automatic transfer from station to station.
- ★ Automatic gravity operated cam clamping.
- ★ Other features: Construction to J.I.C. standards; hardened and ground ways; hydraulic feed and rapid traverse; a coolant system; chip conveyor for automatically moving chips to a central disposal point; automatic lubrication.

Established 1898

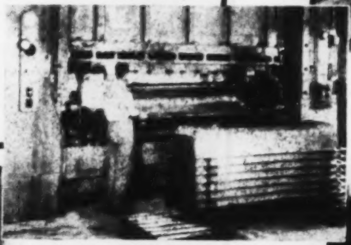
THE CROSS CO.
DETROIT 7, MICHIGAN
Special MACHINE TOOLS

Creative METAL STAMPINGS

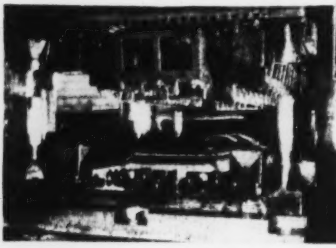
...for BIG, DEEP DRAWN seamless steel caskets

used in the
U. S. ARMY
REPATRIATION PROGRAM

• BASE— return flange being rolled on 18-gauge metal base using Whiting trimming and flanging machine.



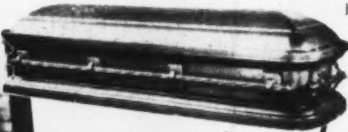
• BODY—single draw operation is performed on a huge Clearing double-action hydraulic press. Material: 16-gauge steel.



• LID—26 hole simultaneous piercing of 16-gauge steel being performed on a large Lake Erie hydraulic press

Component parts as pictured are shipped to prime contractor for complete assembly, upholstery and finish.

• MOLDING—48 hole simultaneous cam pierce and countersink operation being performed on a Marion single-action hydraulic press. Material: 20-gauge steel.



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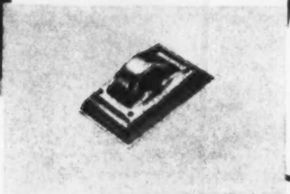

• HARDWARE—20-gauge steel hand rail plates (12 per casket assembly) produced on a Bliss OBI Press.

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THE LEAKE STAMPING COMPANY [illegible]

tended application in replacing critically short metals and alloys and in reducing costs, particularly in the replacement of steel castings and many steel forgings, etc. A typical example is Meehanite rolls, replacing forged steel rolls in a pyramid plate bending unit handling plate thickness of up to 2½ inches, bending cold to 66 inch diameter.

"Manufacture of castings to superior finish and precise dimensions has received great impetus by the development of a technique of molding procedure that does not involve the complexities of the so-called wax process or the limitations of castings dimension and rigid equipment imposed by the shell process using plastic bonds.

"Further progress has been made in the field of nodular iron castings in the recognition that this is not tied up to magnesium alone. Some advancement has also been made in reducing cost of manufacture by specialized melting and nodularizing without involving the use of costly raw materials and excessive use of alloys. Meehanite Metal Corp. developed the use of lithium, which gives excellent results and gets away from residual alloy problems. This is proving economical, despite the temporary high price of lithium."

"UNPRECEDENTED swing to mechanical forging presses is one of the outstanding publishable developments of the past year in our segment of metal processing.

"Complete re-designing of our new Maxipresses, a five year process in which experienced forgemen participated, has just been completed. These stronger, highly reliable new forging presses—frequently teamed with fast, simple, blank-preforming National Reducerolls—are now meeting the more exacting requirements demanded of the forging industry since Korea.

"For instance, new Maxipresses are equipped with tonnage indicators which furnish blow-by-blow dial-indicator readings in tons. Many other new features include the disk brake, a longer-lasting, more trouble-free clutch, and an eccentric with 30 per cent greater strength.

"Having developed mechanical forging presses from the beginning, we are gratified to co-operate with our industry's new thinking in terms of clean, efficient, standardized allpress forging installations."

"WE HAVE broadened our field, which has been limited to mechanical straight side presses to include a complete line of hydraulically operated punching and stripping equipment particularly adapted to the jet engine program and also to automobile and truck side frame work. This new line is being built under license of Mueller patents and has been successfully used by a number of the larger frame fabricators.

"The jet engine program has called for a special adaptation of these units to punch holes in the retainer rings for the jet blades and should prove a welcome solution to a very difficult problem. The mechanical press is finding a more ready market among airplane builders and is being adapted also to steel shell case extrusion from 20 mm size to 5-inch. New methods have been developed to keep the drawing speeds within workable limits without cutting down on the production possibilities of the mechanical press, thereby reducing the number of operators, number of presses and dies."

"NECESSITY of quickly meeting urgent war production requirements this year, coupled with a forced economy of materials, principally steel, has again called for ingenuity and improved design. Manufacturers of heavy equipment and tooling as well as manufacturers of end items have had to face the problem of materials in short supply. This condition naturally demands greater versatility of press equipment and greater flexibility of materials handling equipment.

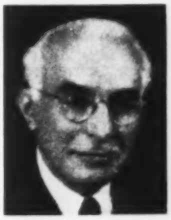
"In the field of forging and forming, particularly where methods and operations peculiar to wartime ordnance requirements are concerned, we have had the opportunity to actually make use of lessons learned and information gathered during the last emergency. A good example is press equipment we built this year, to forge three

R. G. FRIEDMAN

vice president-engineering, National Machinery Co., Tiffin, O.

EVERETT K. MORGAN

gen. sales mgr., mechanical press div., Danly Machine Specialties, Chicago



DAVID C. VERSON

president, Verson Allsteel Press Co., Chicago sizes of large caliber projectiles. The actual forging operations have been reduced to three, and the entire line-up has been made automatic including descaling, transfer of billets and forgings, and lubrication and tooling of punches and dies."

Mr. Glasner:

"MECHANICAL double action presses are being built to increase production by approximately 60 per cent without increasing draw speeds. These presses when used with automatic feeds have increased over-all production more than 100 per cent. Lower draw speeds tend to reduce spoilage and make possible the use of lower grade sheet steels. At present a line of single action draw presses of similar characteristics is being developed. Press production engineers are aiming to synchronize press speeds for greater output.

"Horizontal hydraulic presses for cylindrical shells, such as cartridge cases and the like, are being manufactured. The operating cylinder is located in the center of the machine. Die stations are located at each end of the press. The operating cycle is so arranged that when the punch is being withdrawn from one die it moves into position and completes the operation on the opposite die, thereby increasing the production capacity over the conventional vertical hydraulic press.

"At present, a 1500-ton mechanical variable speed laboratory cold steel extrusion press is being developed. This press will be equipped with recording instruments to register pressures at the impact and during the extrusion stroke. Instruments are also provided to measure the speed of the punch during the extrusion cycle so as to determine the most efficient operating conditions relating to tool life and production. This type of equipment will enable press and die engineers to determine accurately the pressures required for the cold extrusion of various materials and shapes.

"New types of forging presses are replacing other methods for the production of a great variety of forgings. Speed and accuracies obtained exceed results produced by previous methods, and the use of presses is favored by many manufacturers of forgings. Experience during the last war has shown that in many instances presses can replace machine tools and often produce required parts at lower costs and higher speeds."

Mr. Van Nort:

"REFLECTING the ever-broadening application versatility and operational flexibility of all-electric adjustable-speed drives in the metalworking industries, 1951 marked the first application of this type drive to deep drawing metal presses. This new application proved outstandingly successful last year.

"This integrated drawing press drive, utilizing the V*S principle of obtaining adjustable speeds, permits an increased rate of production as compared with constant speed units previously used. The new development not only provides slow speed at the beginning of the drawing cycle to start metal flow without tearing, but also furnishes subsequent higher speeds as the operation progresses.

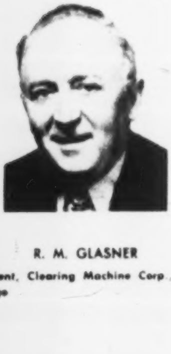
"Elapsed time in performing the drawing operation is further decreased by the drive, as it enables the press to be operated at high speed at those periods in the cycle when the drawing of metal is not taking place. Additional production advantages are secured from the drive through its facility for jogging and slow speed in setting dies, and also through the ability to adjust press speed as desired. The result is high output with minimum scrap.

"By providing such advantages, all-electric adjustable-speed drives can make a significant contribution to greater output as well as cost reduction per piece. These are the pressing needs of the day; and such drives will continue to find wider application because of the direct aid they provide in meeting these critical requirements of diversified metalworking operations."

Mr. Cotner:

"PRODUCTION and developments in the field of hydraulic presses have pretty much paralleled the demands of the mass-production industries. Literally it has been a case of, 'Here's a job to be done—give us a machine to do it!'

"Big, basic strides taken recently are in the development of presses



R. M. GLASNER

president, Clearing Machine Corp., Chicago

J. L. VAN NORT

manager of applied engrg., Reliance Electric & Engrg. Co., Cleveland

JOHN C. COTNER

president, Hydraulic Press Mfg. Co., Mt. Gilead, O.

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to deliver increased pressures . . . deeper draws . . . operate on faster work cycles . . . and to keep abreast of new, cost-cutting production methods.

"A few specific examples in the metalworking field include the development of a new record deep-draw press for the forming of cylinders used for the storage of gases under high pressures. This huge H-P-M delivers the longest stroke (downward travel of ram 108-inches) used so far for the production of pressure vessels. The long stroke permits use of reverse-draw dies in which the blank is virtually turned inside out to accomplish the exceptionally deep drawing required. This process has saved manufacturers numerous annealing and drawing operations formerly required in this type of production. H-P-M ordnance presses for the production of cartridge cases have been completely redesigned to give the rigidity required for the extremely fast pressing speeds which run up to 795 inches per minute.

"Demand for big presses remains strong and export activities continue at an accelerated pace, including the Japanese market."

Mr. Dillon:

"FEASIBILITY of cold extruding steels with the aid of nonmetallic surface coatings combined with lubricants was discovered and technically developed in Germany before the last war. In this country cold extrusion was first investigated and applied to ammunition components under U. S. Army sponsorship.

"Recently, superiority of the cold extrusion process and its modifications over some conventional fabricating methods has been recognized more widely. As a result, numerous developments are under way aiming at improvement of existing manufacturing operations.

"Provided the shape of a part lends itself to cold extrusion, extruding it into the finished form without scrap or with very little loss of material is usually more economical than machining the part. Due to work hardening, cold extruded parts have considerably higher tensile properties than the original material. It is, therefore, possible in many cases, to replace more expensive metals and alloys with less costly ones and to save heat treating operations. Uninterrupted flow of the fibrous structure, further increases their fatigue and impact resistance.

"The non-metallic surface coating, such as phosphatizing, required in cold extrusion to prevent scoring and to ease flow of material, permits the attainment of excellent surface finish and very close tolerances; thereby eliminating the need of most, if not all, finish machining operations.

"We feel that cold extrusion fulfills today's requirement of producing more and more accurate and cheaper and stronger parts from a given tonnage of material better than most conventional manufacturing methods."

R. E. DILLON

president and general manager, Lake Erie Engineering Corp., Buffalo

Mr. Kinney:

"SUCCESSFUL operation of a high speed swing type roll feed for power presses has led to the development of other sizes of this type. The feed is driven from a conventional crank on the left end of the press shaft by an auxiliary parallel shaft through the back ribs of the press. This shaft is driven intermittently through a roller grip clutch on its left end and is positively prevented from backing up by another clutch acting at its right end. Near each end of this shaft is a vertical shaft driven by hardened spiral gears in a bath of oil which, in turn through bevel gears, drives the lower roll of the roll feed. This shaft also serves as a pivot about which its roll feed may be swung away from the press for easy access to the die from either end.

"Cams are adjustable to vary the roll opening to suit different thicknesses of stock and to time the lifting of the upper rolls to suit the length of pilot punches used. Rolls are automatically closed on the first down stroke of the press, allowing the stock to be positioned by hand in exact register and eliminating the partial feed usually associated with the first press stroke."

G. R. KINNEY, V. & O. Press Co., Hudson, N. Y.

Mr. Herkenhoff:

"DESPITE a backlog of 10 to 12 months, mechanical press manufacturers are not receiving any consideration on their applications for certificates of necessity from the Defense Production Administration. The ground for refusal: 'There is no national shortage or regional shortage for facilities for the production of mechanical presses'.

"Actually, presses on order are required for nearly every phase of the defense program. The high productive rate of mechanical presses is being applied to parts used in jet engines, airplanes, ships, tanks, trucks, communications, electronics, or to any forged

JOHN F. HERKENHOFF

president, Minster Machine Co. Minster, O.

DESTACO

"MULTI-SLIDE"* precision stampings . .

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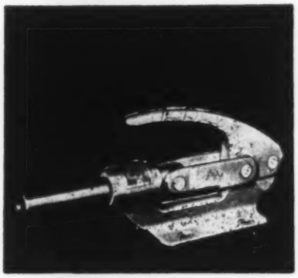
Avoid paying for extra operations by using our "*Multi-Slides.*" Your savings represent production economies measurable in three ways . . . you save tying up *machine time* for second operations, you save on *handling time,* and you save on *inspection time.* This accumulated saving often exceeds 50% on price of parts. ● Our "*Multi-Slide*" machines take coil stock up to 2½-inches wide and 12-inch blank length. They are positive cost reducers on high volume parts production. They perform all operations such as piercing, blanking, forming, swaging, embossing, twisting, curling and re-forming *from coiled stock* as fast as you want production scheduled. This is an especially advantageous method where forming around a mandrel is required. ● For clips, contacts, bearings, terminals, connectors, rotors and tubular shaped parts, this is the *fastest means* known to industry for producing *accurate stampings* to exacting specifications *in quantity.* ● Send specifications and blueprints for a quotation on any part that you think might be made by this method. A "DE-STA-CO" representative near you will see that you get prompt attention and competent follow-up service. ● With drawing and stamping capacity up to 250 tons; coining capacity to 400 tons; automatic press feeds, tool and die facilities; modern slitting and shearing equipment and wide range of raw material inventory—we can be a most important source for you today.



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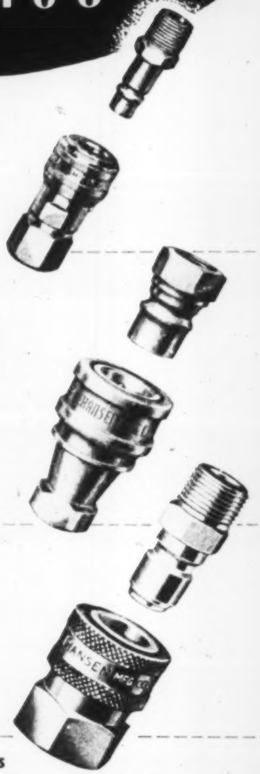
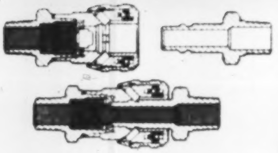


HANSEN PUSH-TITE COUPLING

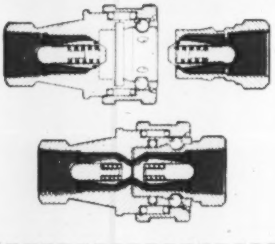
Shuts off one side of line

Gives quick connection and disconnection, with instant automatic flow or shut-off. To connect coupling, and open line to flow of fluid, merely push plug into socket. To disconnect, a slight pull on sleeve releases plug and shuts off supply end of line.



HANSEN HIGH PRESSURE TWO-WAY SHUT-OFF COUPLING

To connect, pull back sleeve and push plug into socket. Identical torpedo type valves permit free flow of gas or liquid through coupling. To disconnect, pull back sleeve—coupling immediately disconnects, valves automatically seal both ends of line. Can be mounted to disconnect automatically where fluid lines may be subject to sudden, damaging strain.



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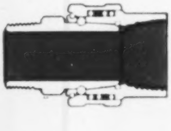

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THE HANSEN MANUFACTURING COMPANY

4031 WEST 150th STREET • CLEVELAND 11, OHIO or stamped parts used in war tools. Mechanical power presses also play a very important part in the production of shell cases and small arms ammunition. In fact, a brief look at the events of the last war would soon place the press manufacturers as an important part of the combined total of all capital equipment manufacturers.

"Press manufacturers are doing everything possible under existing circumstances. The present tax structure makes expansion difficult, but where necessary it will be done to the best ability of the press manufacturers involved. However, it would be well for the government to recognize the handicap to expansion that exists. Proper consideration should be given to a group that is contributing a great deal to the defense program, and to the welfare and economy of this country by providing new and cheaper methods of producing stamped parts.

"During a war period or during a defense program, most companies very willingly increase their capacity by installing labor saving and modern machinery if permitted to write it off under what is termed the 5-year plan of depreciation. Does this mean higher cost of production and higher labor cost? Certainly not! Nor does the great increase in research expenses to find new technologies mean higher prices or labor costs."

Mr Roper:

"CONTROL of sulphur in conventional cupolas used to melt cast iron is becoming a more difficult factor in foundry operation. With the gradual increase in coke requirements and the higher sulphur present in foundry cokes, it is readily apparent that there is an urgent need for the practicable method of removing sulphur from molten iron.

"Calcium carbide has long been recognized as the ideal compound for sulphur removal as far as its chemical properties are concerned. However, the low density of calcium carbide and its very rapid rate of reaction, did not permit its use by any of the standard methods.

"Extensive research and development work has been done to perfect a method for adding calcium carbide to molten iron to desulphurize the iron rapidly, efficiently, and economically. It is now apparent that by injecting the calcium carbide below the surface of the iron with a carefully regulated carrying gas stream, the use of calcium carbide will become an important method of treating cupola iron.

"Research and development work is continuing to improve the various mechanical factors, and it is expected that a continuous treating process will be developed for use with front slagging cupolas. By means of calcium carbide, sulphur in the iron can be reduced from the 0.15-02 level to below 0.01, and the overall cost of the operating is comparable to that of other desulphuring methods. Advantages of calcium carbide are its consistency of sulphur removal and the consequent improvement of the physical properties of iron castings due to the removal of sulphur."

Mr Miller:

"A REVOLUTION is taking place in production methods in the foundry industry. Assuming the demand for foundry products remains reasonably high in the future, there seems to be little doubt that in a period of a few years automatic production of molds will be almost universal in all but the heavy jobbing foundries. A considerable start has already been made in that direction and the benefit has been two-fold in that remarkable savings have been made and labor supply problems have decreased.

E. H. ROPER

manager, technical sales div., Air Reduction Sales, New York

"Operations which have always been considered as requiring the hands to perform are now being done by automatic machinery. The foundry of the future will truly be a push-button operation."

Mr Burgess:

"MOST SIGNIFICANT development in the gray iron industry is the rapid growth in basic cupola melting as opposed to standard acid cupola melting. Some 50 foundries are experimentally melting with basic-lined cupolas or have already swung to this method for their regular production. The benefits include ability to produce gray iron higher in total carbon, lower in sulphur and a higher tapping temperature than is normal in acid melting. Basic melting, therefore, helps the foundryman to meet raw material shortages, particularly as concerns the scarcity of high grade coke, pig iron and cast scrap.

"Use of basic-lined cupolas will continue to expand during the coming year. Wider use of nodular graphite or ductile irons will give further impetus to this development as a basic-melted, low sulphur iron is particularly suited to their production.

"Handicaps of basic cupola melting, which reside mainly in high cost refractories and a tendency to stiffer slags than in acid process, can and, in fact, are being progressively solved. Water cooling or water jacketing basic refractories in the melting zone is one answer to reduced refractory cost, and the benefits are so great that it is expected that water cooling will eventually be used in standard acid as well as basic cupola melting. The renewed interest and research in the cupola melting process, sparked by experiments with basic melting, can be expected to improve standard cupola practice throughout the country and, consequently, increase the uniformity of gray iron.

"Shell molding, the use of thin resin-sand molds on heated patterns, has reached full production level in a number of foundries. It is considered that this method will set new casting standards as concerns dimensional tolerances, surface finish and range of small size parts.

"A particular burden has been placed on the gray iron foundry industry during 1951 by the widespread use of gray iron castings as replacements for materials in even shorter supply. The industry has met this challenge by an estimated increase of 25 per cent in total tonnage over 1950."

C. O. BURGESS, technical director, Gray Iron Founders Society, Cleveland.

Mr. Roast:

"OUTSTANDING development in the foundry field in 1951 is the interest shown and the progress made in the new shell molding process. This has now passed the initial period of trial and error, and the pilot plant stage, and has entered the production field both in iron and tin bronze and to a less, though ever growing extent, in aluminum, alloy steels, manganese and aluminum bronze.

"While shell molding is not a universal cure for all foundry problems it does eliminate a great number of them, at the same time reducing costs and improving labor conditions. Machines are now being designed along automatic lines that augur well for increased output per man hour. Shell molding will survive and become a permanent and necessary part of foundry work, especially where many castings are needed from the same pattern. In this process molds can be made and stored with safety, or even shipped from one plant to another if this is required.

"Adoption of continuous casting for steel is another important new development. Still more recently the inverse cold extrusion of steel billets as opposed to hot extrusion is significant, this latter being made possible by the development of a suitable lubricant."

Mr. Sherwin:

"BASIC-LINED cupola is of considerable advantage as it can be used to obtain a reasonably high carbon iron, very low in sulphur, with high scrap and low pig iron charges. It is particularly suitable for making nodular iron. If we are faced with a new shortage of pig iron, this type of cupola can be used to great advantage among gray iron casting producers.

"Last year saw an increase in hot blast cupola operations. The use of a hot blast results in greater fuel economy in addition to such advantages as obtaining satisfactory carbon contents with a larger percentage of scrap in the charge. Installation of a hot blast enables the foundryman to maintain a high quality when faced with the necessity of using inferior materials.

"Another development which has received some favorable use is the hot salt bath for simultaneously cleaning as well as stress relieving.

"Shell molding has made progress. Castings can be made to a much closer tolerance than by ordinary sand molding. The closer tolerances mean less machine work in the machine shop and therefore become increasingly important as labor costs increase.

"With the shortage of aluminum, gray iron foundry operators will probably receive more and more inquiries for castings in gray iron which were formerly produced in aluminum. This, however, will only be a temporary demand until such time as more aluminum becomes available.

"Considerable interest is being shown by larger foundries in the development of pneumatic sand transmission. It has been applied practically to the transmission of core sand from the mixers to the core makers' benches. Whether or not it will be practical to transmit molding sand by this method remains to be seen."

Mr. Lansing:

"1951 marked the first year in which malleable casting production exceeded 1 million tons. New capacity developed during the year has generally resulted from the balancing of facilities to eliminate any bottlenecks. In some cases this has taken the form of new or additional annealing, or other equipment.

"Supplementary heat treating equipment has been installed in a number of instances to provide for the handling of additional requirements for pearlitic malleables.

HAROLD J. ROAST

bronze foundry consultant, London, Ontario, Canada

E. B. SHERWIN

president, Chicago Hardware Foundry Co., N. Chicago, Ill.

JAMES H. LANSING

technical & research director, Malleable Founders' Society, Cleveland

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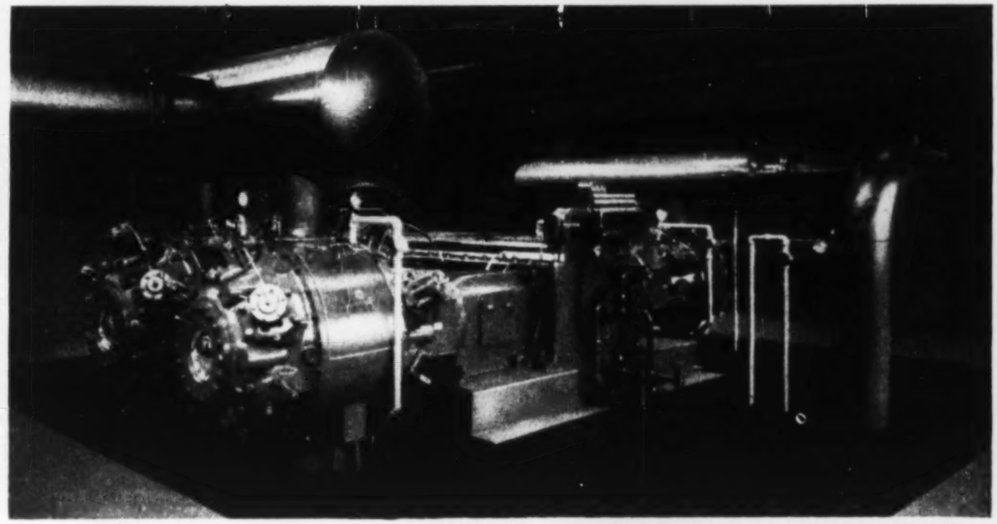
that's saving space and manpower



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Barcelona, Spain • Brussels, Belgium • London • Paris • Varese, Italy • Ankara, Turkey • New Delhi, India

These materials, of higher strength and wear resistance but somewhat lower ductility and impact values than standard malleables, have found increased use in automotive rocker arms and other applications where greater hardness and wear resistance are required.

"Great volume of malleable production is of course in the standard malleable grades covered by the long-standing and universally required ASTM specification A 47. These cover minimum requirements of 50,000 and 53,000 psi tensile strength, 32,500 and 35,000 psi yield point, and 10 and 18 per cent minimum elongation. In 1951 ASTM recognized a substantial use of standard malleable castings by providing new specifications A 338-51T, to cover malleable iron flanges, pipe fittings and valve parts for railroad, marine, and other heavy duty service. These specifications call for the use of the standard A 47 grades of malleable.

"In 1952 malleable production may be somewhat less, due to automobile production curtailment occasioned by steel scarcity. Large tonnages of malleables, however, go into military trucks, jeeps, and other combat vehicles. Advantage is also taken of malleable's versatile castability to save excess metal, also to save machine tool time due to its ease of machining."

Mr Clarke:

"SOMEBODY once said that 'forging is an art'. The transition from art to science involves a careful definition of objectives, continuing study, and much research. This transition within the forging industry has been under way for some time with major contributions being made by the members of industry. Two projects involving studies of the basic flow of metal under impact have been inaugurated in two of the country's leading universities and promise, as time goes on, to make major contributions to this evolutionary process."

E. C. CLARKE JR., vice president & works mgr., Chambersburg Engineering Co., Chambersburg, Pa.

Mr Hall:

"RECONVERSION of many steel foundries to the production of cast armor for tanks and other structures is the most noteworthy trend during the last year. As much heavier material is being manufactured today than was produced during World War II, this has involved the installation of much new and larger equipment for heat treatment, and large, costly equipment for radiographic examination of the cast armor components.

"Investigations of the modus operandi of the filling of refractory molds with molten metal have been carried forward actively during the year by several organizations, and much new information as to the best designs for gates and runners has been derived.

"Industry is turning more and more to the manufacture of weldments made up of castings and rolled or forged material in various combinations. Sometimes the product is made up entirely of castings. The object in making it in sections is the simplification of foundry procedure and consequent saving in cost and improvement in soundness of the several portions of the piece. In other cases, portions of the structure that are almost impossible to make sound if they are parts of a larger casting, are made of rolled or forged material, united to cast parts that would be hard to form in any way but casting, on account of their complicated shapes.

"Foundries are in some cases becoming manufacturers of finished parts for machines and structures, instead of foundries pure and simple. They are finding it advantageous to increase greatly the size of their welding departments. Much of this progress, of course, has been due to the tremendous improvements in the art of welding that has taken place in the last few years."

Mr Juppenlatz:

"CONSERVATION of available raw materials by the low and high alloy casting producers is mandatory if high levels of production are to continue. Demands of industry for castings to serve at high strength levels, more severe corrosion or higher temperatures are expanding, with new processes and many improved engineering components. Better materials are therefore needed, and a logical approach invites the use of more and different grades of alloys.

"Alloy shortages are challenging both consumer and producer, to select materials with a minimum alloy content so as to save alloys for more severe applications as well as to expand tonnage. Habit of using a higher alloyed material than actually required can no longer be justified in this period of emergency.

"Casting producers have recognized the need for alloy conservation with reclamation and higher recoveries during processing. Shortages of nickel, molybdenum and columbium are acute. High alloy

JOHN HOWE HALL
metallurgist,
Swarthmore, Pa.

J. W. JUPPENLATZ
chief metallurgist, Lebanon Steel Foundry,
Lebanon, Pa.

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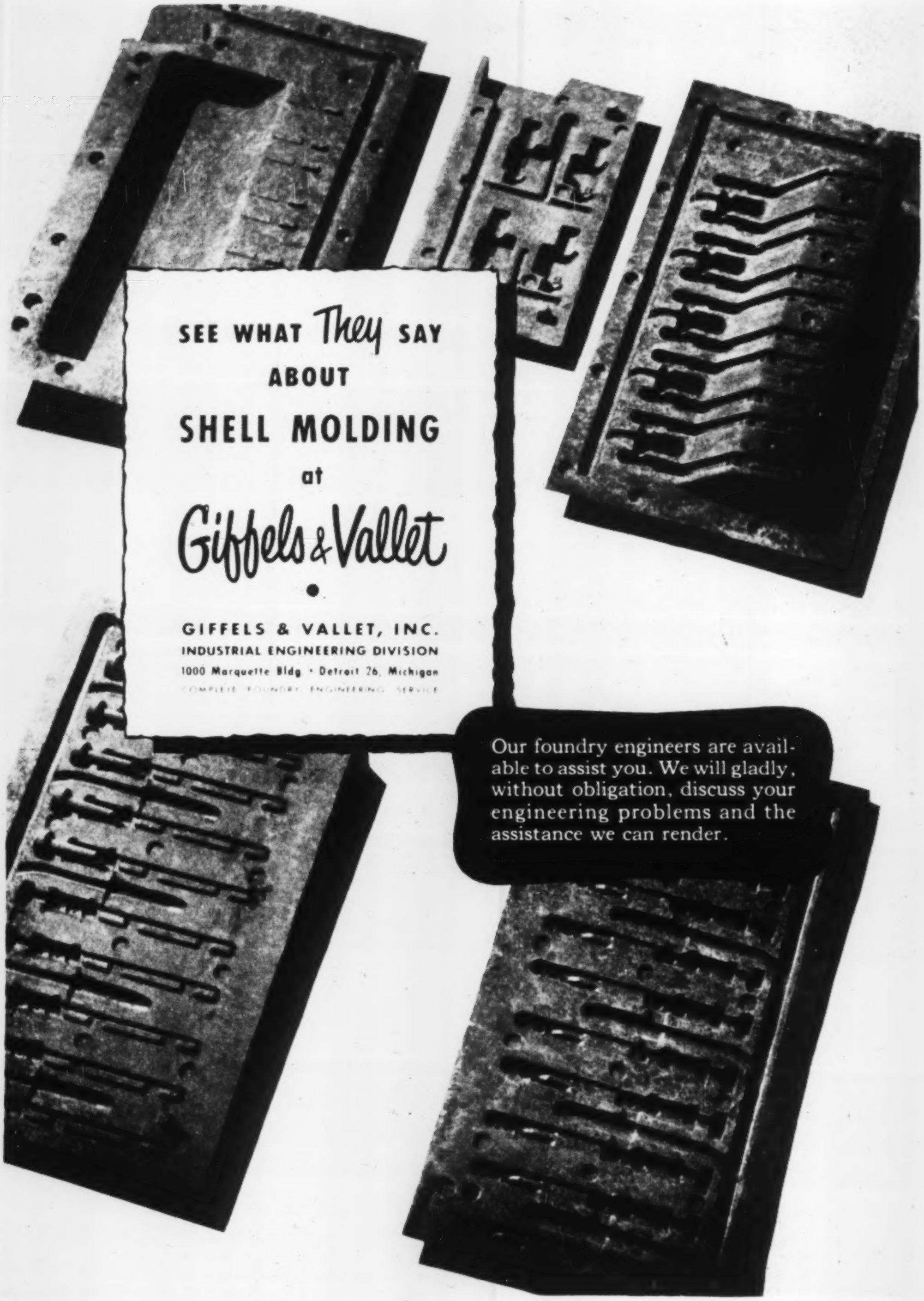

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castings which in the past have been stabilized with columbium are still needed for special high temperature services. The use of titanium rather than columbium as a stabilizer in castings is being explored. Perhaps rare earth elements, inert atmospheres, or unusual additives may bring about substantial improvement of these casting properties."

"**FORWARD** progress of the die casting industry was hampered last year by the acute shortages of raw materials. Despite this curtailment of supply, the demand for die castings, especially those of increasing size and intricacy, keeps growing.

"To keep pace with the expanding use of die castings, research and planning for the future must go on endlessly. As die casting applications are extended in size and complexity, suitable equipment and methods must be devised to produce them. The development of larger and better casting mechanisms, better die materials and casting alloys, as well as the absolute control of the variables of the process, must be resolved.

"One of the most significant trends in die casting appears to be in the increasing utilization of aluminum and magnesium die castings in supplanting the heavier metals. This is particularly apparent in the automotive industry. Besides the important factor of weight replacement with these metals, the economics, not only in relation to cost of metal, but also in the possible savings of horsepower and fuel consumption have their effects. Lower manufacturing costs likewise are affected by the use of light metal die castings.

"Automotive automatic transmission parts as aluminum base die castings are now practically standard equipment.

"In several cases die cast aluminum clutch housings have replaced cast iron, through the skillful determination of proper design of both the parts and the die casting dies for them. In another instance, both clutch housing and torque converter housing are contemplated to be produced as magnesium die castings replacing cast iron.

"In other industries the change over to light metal die castings is noted. As one example, aluminum die castings have replaced cast iron for fractional horsepower motor end bells and there are many other similar applications. It is visualized that the light metals will be utilized in greater quantities than heretofore, when the emergency is lifted and normal supply of these metals becomes available for civilian use."

"**VALUE** of service should never be underestimated. Inventory, production and financial figures are nearly always changing, but throughout the business cycle value of customer service is constant.

"These days of critical material shortages give rise to questions of suitable substitutes, and crowded production schedules produce delivery problems. These and many other difficulties can be resolved only by rendering closely co-ordinated service to the customer. How preferable it is to try to attract a dozen new customers, rather than to try to win back one lost through dissatisfaction!

"We all have sales departments, but perhaps we can learn something from automobile agencies, the signs of which usually read, 'Sales and Service'."

"**LARGELY** ignored in a year in which most reporting related to the enormous expansions of steel and aluminum production facilities and to the tight supply of these and other metals has been the rapidity with which the gray iron industry has adopted the basic cupola.

"Measured against total production the amount of cupola iron produced by the basic process is insignificant. Far from insignificant is the fact that only a handful of companies were tapping iron under a basic slag at the close of 1950 whereas there were at least 50 foundries following this practice at the close of 1951.

"Good reasons have prompted progressive cupola operators to convert a smoothly operating acid cupola to the basic practice with its attendant problems. Among these are are: Ease with which sulphur content can be cut in half and reduced still further with ad-

J. C. FOX

chief metallurgist, Doehler-Jarvis Corp., New York

W. H. WORRILOW

president, Lebanon Steel Foundry, Lebanon, Pa.

HARVEY N. BARRETT JR.

assistant sales manager, Basic Refractories Inc., Cleveland ditional care. Basic cupolas are being operated with a charge of steel scrap and only a little remelt—a strong inducement to convert when pig iron is expensive and difficult to obtain. Carbon content of the metal can be raised well above the carbon content of the charge and can be controlled with a fair degree of certainty. Clean 'drops' are easily obtained and the process of cleaning out the cupola and patching it is relatively simple. With reasonable care the original brick lining will last indefinitely.

"With these advantages, some operators report that the higher cost of the basic refractory materials required is more than offset by savings in labor and quantity of refractory used per ton of iron melted.

"An interesting aspect of the basic cupola story is the fact that the basic gun refractories, Gundol and Gunmix, originally developed for the basic steel industry, have proved uniquely satisfactory for the maintenance and repair of the basic cupola. Borrowing again from the steel industry the foundry is using the BRI Gun to emplace these products."

Mr. Chesnut:

"MELTING furnaces continued to be the greatest item of business in 1951, although sales in all categories were considerably larger than for 1950. Several large equipments were sold for forging, and are working nicely; but there is still considerable room for expansion.

"Principal among the improvements are new and simplified controls, especially for capacitor and power switching; power control transformers, regulating devices and the like. Several new types of furnaces were designed during the year for vacuum, carbide or other special applications. A new 'roll-over' furnace for precision casting has caused considerable interest.

"Ajax enters the new year with a good backlog of orders and is optimistic that production of this vital defense tool will continue to receive the full support of industry and the government."

Mr. Cherry:

"CONTINUOUS annealing of steel strip has been materially advanced through recent installations of large production furnaces. The largest of these installations is a furnace for continuous tin plate annealing having a rating of 30 tons per hour and a maximum strip speed of 1000 fpm. A duplicate furnace is now being installed. In addition, several of the high production, continuous strip annealing and galvanizing equipments are under construction as well as continuous furnaces for annealing silicon steel strip.

"Defense production not only throws a large burden on the furnace industry from a procurement and production standpoint but also requires many new developments for specific applications and new designs to conserve critical materials. A typical example is the annealing and heat treating of steel cartridge cases. Final selective heat treating operation called for the development of new technique in induction heating and handling fixtures. The annealing of the large steel cases between forming operations necessitated the development of large production furnaces needing a minimum of floor space.

"Electric furnace brazing is again demonstrating its value in the high production of many parts for the armed service."

Mr. Lewis:

"FLATTENING parts by annealing under weights, thus eliminating or greatly reducing expensive hand straightening, is one example of a process developed recently at IBM to produce quality and quantity precision parts.

This new method is basically the flattening of stamped parts to predetermined limits. Parts are mostly 1010 or other mild steel, though some are alloy steel. Most parts, varying widely in size and shape and in thickness from 0.025 to 3/16-inch, are stamped or otherwise made from sheet or strip stock. Parts are laid or stacked between flat steel plates of a specified weight with no other pressure applied. They are then annealed in a continuous belt-type furnace, which has an exothermic atmosphere.

"Flatness obtained by this method also has the advantage of relieving the stress and strain in-

F. T. CHESNUT

Ajax Electrothermic Corp.,
Trenton, N. J.

R. M. CHERRY

mgr. sales, industrial heating div., General Electric Co., Schenectady, N. Y.

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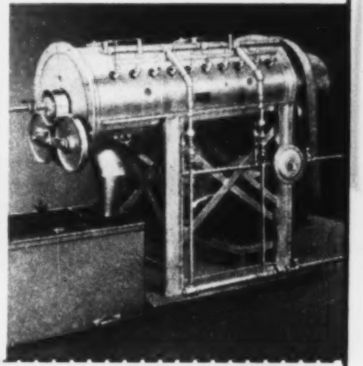

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duced by previous operations. This produces a more stable part to work with when additional machining or heat treating operations

"Benefits realized are considerable, not only because of cost savings, but because troubles and delays in manufacture have been notably decreased."

"SUBSTITUTING for substitute materials will force engineers to use the information available to help solve some of their heat treating problems, and thus conserve some of our scarce alloys. Hardenability and severity of quench values, 'S' curves and other tests, tell us something of what occurs when steel is heat treated and with this information we can predict approximately what the resulting constituent or properties will be under controlled treatment.

"Most structural parts are designed for minimum tensile properties. Since alloy steels, regardless of composition, have strikingly similar tension qualities when fully hardened, we have only two factors to consider; hardenability and severity of quench. Hardenability is in part a set factor, but severity of quench is a variable that can often be improved upon in the manufacturing plant.

"Marcus A. Grossmann's work on hardenability showed that the critical diameter can be greatly increased by increasing severity of the quench through agitation of the quenching medium. For example, the critical diameter of a steel can be increased from 1¼-inch in oil not agitated, to 1¾-inch in good agitation, and to nearly 2¼-inch in violently agitated oil. This increase in agitation will permit use of a lower alloy and hardenability for a part, or the same material can be used for a heavier

"Many heat treating problems can be solved by improved quenching methods and much alloy can be conserved if only steel with the minimum hardenability were used."

"WITH today's material shortages the importance of long years of experience in designing and building heat treating equipment is more pronounced. In many cases nothing but experience can determine when a substitute material may be satisfactorily used.

"This same experience is extremely valuable in building equipment for heat treating war materiels. At Holcroft & Co. where we have the experience gained in World Wars I and II, we have been busy during the past year with equipment required for the rearmament program. This work will continue during the coming year.

"Tendency toward use of gas atmosphere furnaces is continuing. Additional furnaces for heat treating bolts in an atmosphere to control carbon were built in 1951. Laboratory and field work on the proper proportion of hydrocarbon and nitrogen additions to carbo nitriding furnaces has increased the use of this process and very successful results are being obtained. Additional high temperature head forging furnaces have been built, eliminating the use of a large number of small burners and substituting a smaller number of large burners."

"IN THE field of annealing high carbon steel bar stock with rectangular bell type furnaces, a new development makes possible the elimination of inner charge covers, while at the same time using only moderate amounts of protective atmosphere make-up. This is accomplished by rapid recirculation of the furnace's Monogas protective atmosphere (a combusted lean air-gas mixture with carbon-dioxide removed) through an external drier for the removal of water vapor evolved from exposed brickwork or other sources. By this means, a moisture content corresponding to a dew-point below 0°F is attained in the charge space.

"Elimination of the inner charge cover produces a substantial saving in maintenance cost. The amount of Monogas required for make-up in the case of a furnace having inside dimensions of 18 x 6 x 5 feet has been only 250 cu ft per hour. Work having a decarburized surface layer may have this carbon rapidly restored by the addition of appropriate small percentages of methane, or other hydrocarbons, to the furnace atmosphere during the annealing cycle.

ARNOLD P. SEASHOLTZ

consulting engineer, Seasholtz Metallurgical Service, Lancaster, Pa

W. H. HOLCROFT

executive vice president, Holcroft & Co., Detroit

JOHN G. HOOP

industrial heating engineer, Westinghouse Electric Corp., Meadville, Pa

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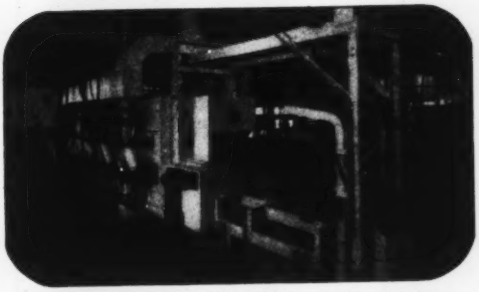

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"There is a recent pronounced trend toward the use of protective atmosphere generators with a higher capacity per unit, as a natural corollary to the continuing growth in the use of protective atmospheres for metallurgical processes. In the case of Ammogas generators (ammonia dissociators), their use in hydrogenation processes by the food industry and other chemical applications have accounted for much of the demand."

Mr. Lynch:

"WE HAVE been working in two directions: Toward conservation of critical alloys, we are further developing the salt bath for hardening of high speed cutting tools with excellent results on steels containing less critical tungsten. Accelerated quenching oils are in use at present on production steels of lean alloy content. This oil was developed over a year ago in anticipation of the present and near future conditions.

"Standard salt bath mixtures are finding new uses in armament heat treating. Martempering and other variations of isothermal heat treating, such as cycle annealing, are suitable for salt bath application.

"Relatively new is the use of salt baths for high temperature heating prior to forging of the press or extrusion type. We predict a real future for this application of the very flexible salt bath. A recent spectacular installation indicates size is no problem. A salt bath holding over 70 tons of neutral salt at over 2200° F is to be used for heating billets prior to extruding complete propellor blanks on huge new hydro-presses. The salt bath industry is keeping up with all developments to make their contributions to improved processing."

Mr. Podesta:

"ADAPTION of J.I.C. standards to our machines has simplified the stocking of hydraulic and electrical equipment. Also, service calls on machines with the new standards have been reduced considerably in comparison with previous experience.

"Experience in the use of molybdenum steels during World War II has helped considerably on the present defense program. Also, new developments for special heat treatments have tended to keep loading or galling of our broaching tools to a minimum.

"Operating strokes of both horizontal and vertical type machines have been increased to enable us to complete operations in one pass as compared with previous designs of two or three passes. By completing an operation in one pass we have been able to eliminate a great deal of troublesome work hardening of materials between operations.

"Average broaching speed is approximately 30 fpm, maximum. However, we have built machines with broach speeds as high as 60 fpm. Rather than develop high broaching speeds which add to horsepower input and greater overall machine size, we have been developing automatic handling of parts and hydraulic operation of fixtures wherever possible. With the perfection of automatic handling and clamping of parts, the machine operating speed can be increased to be in step with the production limits established by the handling of the parts."

Mr. Adam:

"REARMAMENT has created a demand for electric salt bath furnaces about five times greater than in 1950 and twice as great as the peak year in World War II. Manufacture of this large volume of equipment is being greatly aided by the use of a totally submerged electrode heating system in most of these electric furnaces since the use of high nickel alloys is unnecessary and alloys containing little or no nickel can be substituted.

"In addition to the greatly expanded use of salt baths for regular heat treating operations, such as neutral hardening, martempering, austempering and carburizing, several new applications have recently found commercial application. A number of steel mills have installed large electrode type salt baths for heating steel billets for extrusion. Choice for this use was dictated by the ability to heat billets to a temperature of 2275°F. extremely fast and uniformly and with the complete absence of scale. One such installation has a con-

R. N. LYNCH

Park Chemical Co., Detroit

JOHN W. PODESTA

vice president, American Broach & Machine Co., Ann Arbor, Mich.

WILLIAM N. ADAM JR.

vice president, Ajax Electric Co., Philadelphia

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"For the new method of manufacturing high explosive shells by the cold extrusion process, salt baths are being used exclusively for the annealing operations between extrusion steps. Speed of heating, close control of the annealing temperature as well as the ease of conveyorizing these production furnaces accounts for their adoption by all shell contractors. The salt bath is also being widely adopted by the heat treatment of many other important defense items such as aircraft frame and engine components, armor piercing shot, cartridge cases, bazooka motor bodies, machine gun parts, jet engine parts, etc."

Mr. Mawhinney:

"PERIODS of high production are not normally advantageous to the development of new ideas, at least as far as industrial furnaces are concerned. In such periods, the users of this equipment cannot experiment with new designs because of the necessity for maintaining production, and the suppliers have neither the time nor the incentive to develop them. For that reason, few novel furnace designs have been developed in the past year and few novel furnaces can be expected in the coming year.

"Exceptions to this general statement include a very large continuous strip annealing furnace for tin plate stock, which will very likely encourage the construction of many additional strand annealing furnaces to replace the slower hood type furnaces for intermediate annealing of coiled strip. Others are the continuous annealing of alloy bars in special atmospheres to control surface carbon, improved firing methods for soaking pits and heating furnaces, and broader applications of induction heating.

"In spite of restrictions and difficulties in the use of suitable heat resisting alloys, an unusual number of furnaces based upon standard designs are being constructed for all types of metal treatment in this country and abroad, and the indications are that this activity will continue during the coming year. Results of this activity will be reflected in the creation of many new ideas, which will accumulate for development in subsequent periods of normal business in the furnace construction field."

Mr. Lucas:

"1951 has a busy year for most makers of capital goods. As 1952 approaches it becomes more apparent that defense order priorities are going to have a greater effect on our way of doing business than we have previously experienced. Many machinery manufacturers who are unable to obtain sufficient rated orders are going to be compelled to change over to defense work.

"New develoments in the type of machinery our company manufactures, such as high speed tube and pipe welding at speeds up to 500 fpm, electric welding of aluminum, brass, copper and stainless steel tubing at speeds of 100 fpm and many improvements in electronic controls and induction heating will be used for defense work, to some extent. Wide civilian demand will probably have to wait until the emergency is somewhat less acute.

"Rising labor and materials costs must be met by higher selling prices in many lines. Capital goods manufacturers must be very careful not to increase prices to the point of customer resistance. Such a move will do much to break down a very valuable relationship."

Mr. Hess:

"HIGH-SPEED heating, which has been the subject of many discussions pro and con during recent years, has made some further striking progress during 1951. The scope of this progress can be illustrated by the successful operation of one large-scale installation handling as much as 35 tons of carbon or alloy steels per hour on a high-speed heating schedule.

"Continuous heating of billets in straight line, in the new seamless tube mill of the National Tube Co. at Gary, Ind., for piercing proves that steel can be heated at the rate of 1 inch diameter in 2 to 3 minutes on a production scale, and furthermore that fast heated steel appears more plastic and therefore reduces power requirement for forming or, in this instance, piercing. Heating time and heating technique are subject to further scrutiny and development since they influence end product, quality and value."

Mr. Crosby:

"AN amazing increase in cutting speeds has been responsible for outstanding progress in broaching. Whereas only five or six years ago, at the close of World War II, the common speed at which broaching machines operated was 20 to 25 fpm, today it is general practice to broach at 40 to 75 fpm with standard cutters and at 200 to 250 with tungsten carbide cutters. Return

JOHN LUCAS

president, Yoder Co., Cleveland

FREDERIC O. HESS

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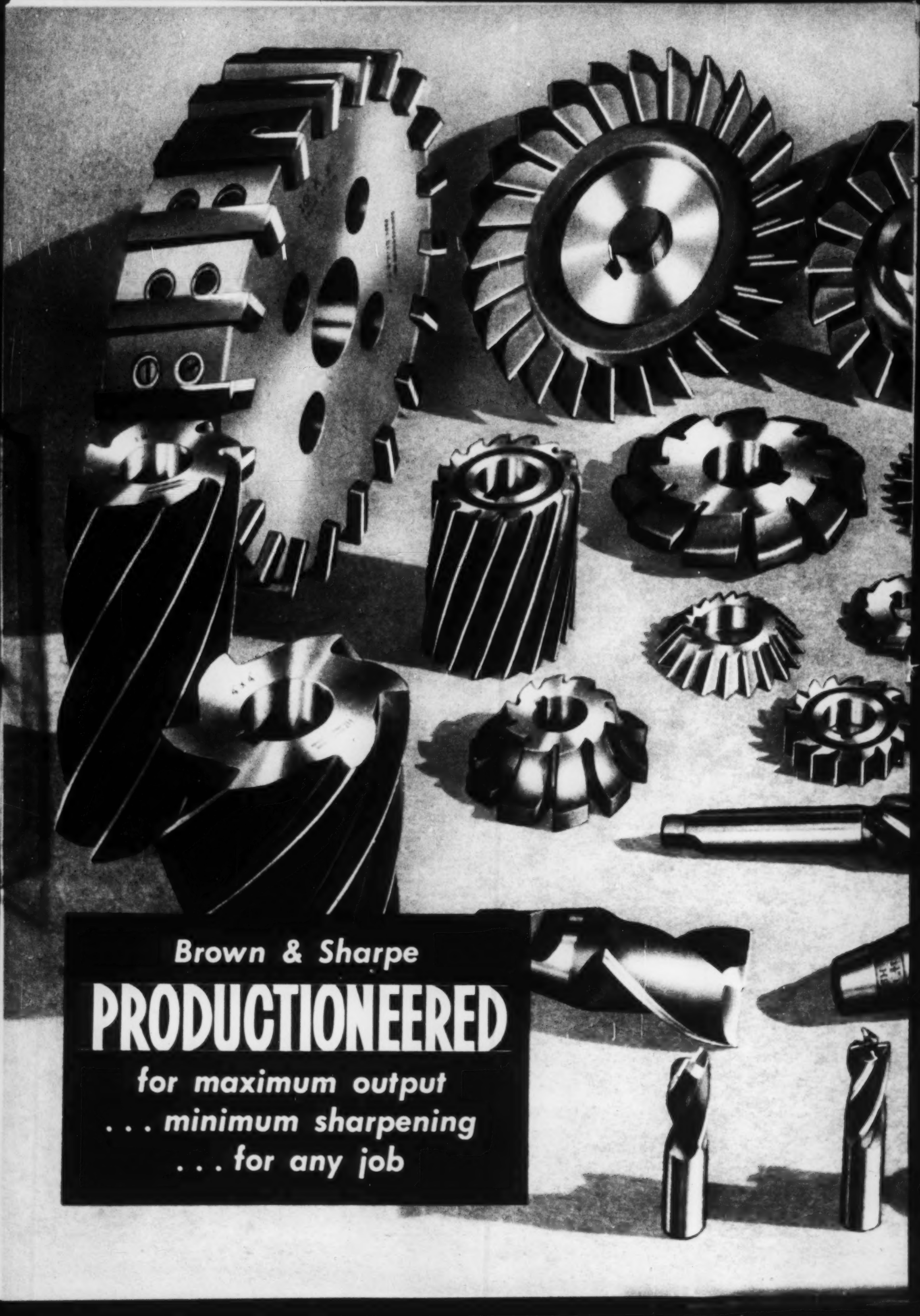

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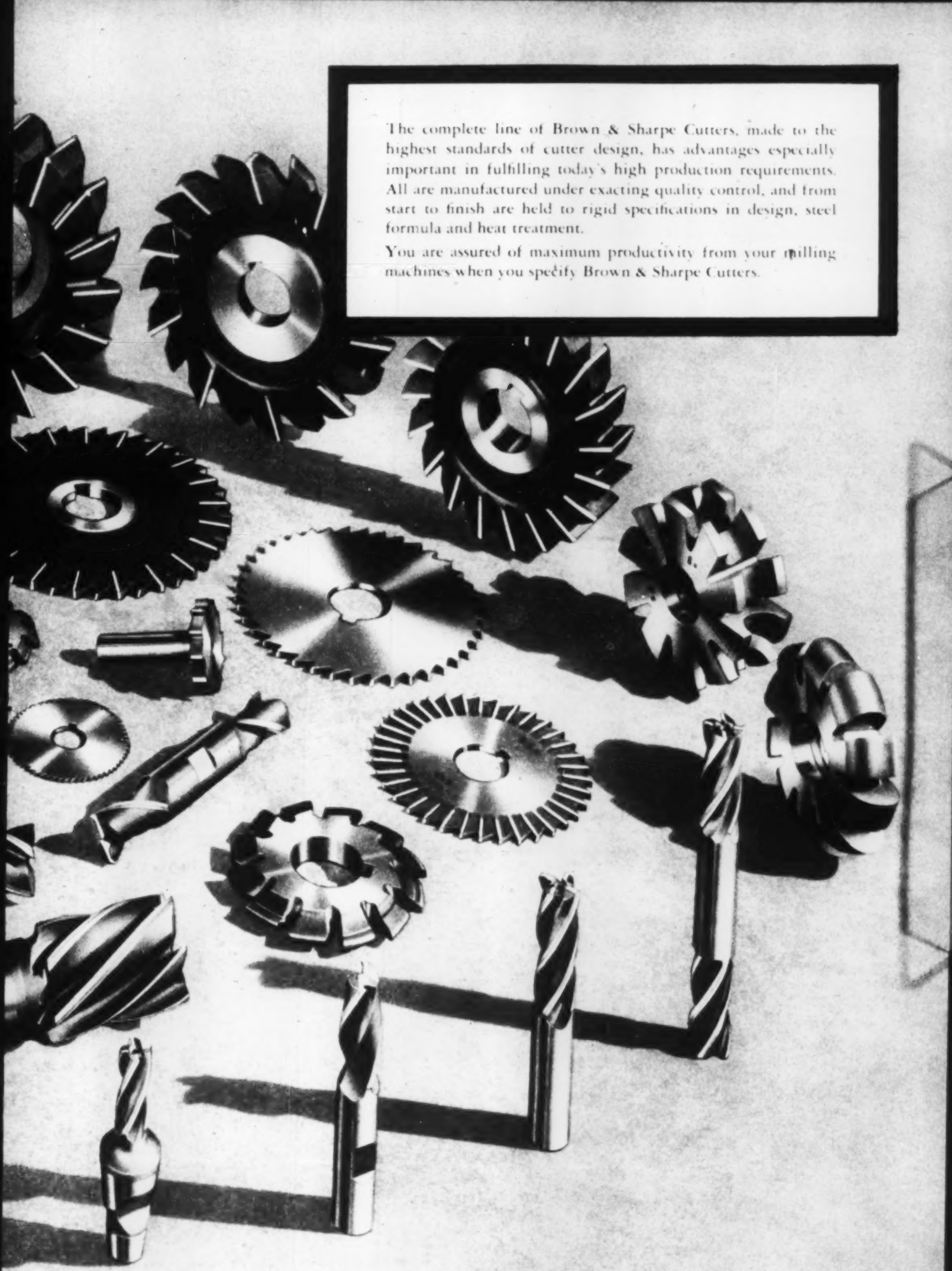

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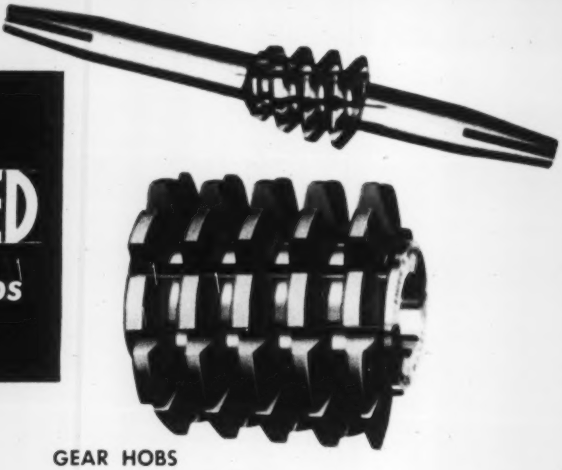

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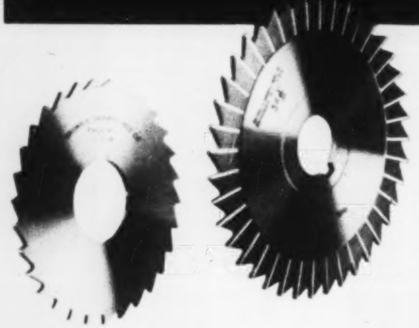
For fast, clean, gear cutting — Stub Tooth, Spur, Worm, Tangential Feed and Special Hobs.



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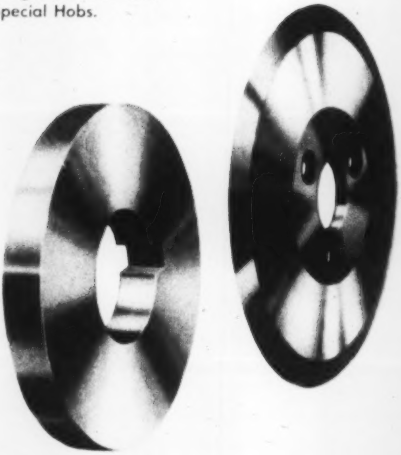
For deep slots, proper clearance.



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For fast stripping or slitting thin metal, rubber, leather, paper and similar materials.

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For speed and economy in quantity manufacture of duplicate parts. Custom made cutters of many types including formed cutters, end mills, carbide cutters.

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speed of the broach today is as fast as 250 fpm.

"High speed broaching has now made possible the doubling and even quadrupling of production. Both internal and surface broaching of intricate forms to extremely close tolerances and remarkably fine finish have contributed greatly to productive effort.

"Need for accelerated production of items required for defense has been a major contributory factor in the development of broaching. Without gains derived through broaching, it is certain that the machining of many critical jet engine parts could not be so speedily or accurately accomplished.

"With the inexorable demand for more production, machines had to be designed that would be capable of high speed operation. Accordingly, broaching machines today are built with the necessary rigidity, the ways are greatly improved, the lubrication system has been developed for maximum efficiency, better means of keeping the oil cool have been devised, and a low pressure hydraulic system provides smoother operation."

Mr. Berna:

"METAL cutting is now on the crest of a great wave of modernization and advancement. During World War II number of machine tools in use in the United States was more than doubled. But there was no time to redesign. The machines were new, but not the models. We entered the peace period still cutting metal by prewar methods.

"Under stimulus of postwar competition, however, and with benefit of wartime experience, the industry redesigned its machines. Objectives were faster cutting speeds, greater rigidity, more flexibility of operation, increased accuracy, more automatic controls, and above all, larger output per man per hour. The new models, according to a survey made at the 1947 Machine Tool Show, showed an average increase in efficiency of 33-1/3 per cent. Since that time there has been continuing improvement to meet the needs of certain types of 'military hardware', notably the jet engine.

"Builders of mechanical presses are making important progress in the production speed, protection against overload and safety, such as automatic feeding and unloading devices. Hydraulic press builders have improved their double-action presses.

"Increase in metal-cutting capacity must therefore be measured in terms greater than the numerical increase in number of machines. On the average, two new machines will do the work of three of World War II make; and as to still older machines, the comparison is in many cases well-nigh incredible.

"With output of 1951 double that of 1950 and an even greater rate of production expected in 1952, progress in metal cutting methods and capacity bids fair to be the most remarkable in the nation's history."

Mr. Hicks:

"COST REDUCTION by automatic machine functions and the elimination of manual operations is becoming a greater factor in production grinding machine requirements.

"A step towards meeting these requirements is the application of automatic grinding wheel truing as exemplified in wheel guard type devices and improvement in precision grinding machine technique which is responsible, together with machines designed for more accurate repetitive grinding, for diminishing waste and cost by reducing spoiled work, the elimination of 100 per cent inspection, and in many cases, the elimination of selective assembly on mass production jobs.

"This type of wheel truing also provides a basic requisite for the next step forward in the precision grinding field—Automation, the automatic mechanical handling of work into and out of a machine. Our company is actively engaged in this program which we think has a great potential for post-defense replacement machine tool business."

Mr. Blackall:

"EVERY American machine tool builder should be concerned over the serious threat to his future market, both here and abroad, which is implicit in the use of Marshall Plan money to build up

TELL BERNA
general manager, National Machine Tool Builders' Assoc., Cleveland

E. N. HICKS
Norton Co.,
Worcester, Mass.

FREDERICK S. BLACKALL JR.
president, Taft-Pierce Mfg. Co., Woonsocket, R. I., and president, NMTBA

British and Continental machine tool builders. Already imports are appearing in the U. S. Many of these machines are of indifferent quality, whose appeal primarily is on a price basis. However, the American builder should not be lulled to sleep by the assumption that all foreign built machines are inferior. Many are surprisingly good, although, generally speaking, not possessing the outstanding characteristics and versatility as to feeds, speeds, and the like, or the capacity of American-made tools.

"For years prior to World War II, the American tool industry could usually count on a reasonably thriving foreign market when business in the U. S. was depressed, since there was almost invariably a lag between cyclical economic trends here and abroad. Foreign business then normally accounted for roughly 30 per cent of U. S. machine tool production. Loss of nearly a third of our potential market will be of utmost seriousness, not only to the American machine tool industry, but to the whole American economy. Growing competition abroad can be expected in any event, but it seems utter nonsense for the American taxpayer to provide funds from which his own best interests will suffer.

"Experience of three wars in less than 35 years has proved beyond peradventure how necessary it is to our national security and well-being that the U. S. machine tool industry be kept healthy and vigorous. Those who agree with this thesis could very well remind their elected representatives in Washington that the present ECA policies could have the effect of drowning ourselves in our efforts to rescue others. If our real purpose is to build up defense against Communist aggression, far less money spent on our own machine tool industry would accomplish a great deal more."

Mr. Ladden:

"MANAGEMENT today is confronted with problems never presented to industry heretofore. Our 'mutton chopped' executives never had the so called fringe additions to manufacturing costs to contend with. Currently, such fringe issues do not create the cost problems that would be most apparent during normal operations. Foresighted executives will weigh decisions in the light of what these extras will reflect during a normal trend of business.

"In there lush days, one can loose sight of values by dealing with dollars—we have so many of them. The dollar broken up into 'pennies' presents a more graphic and imposing picture and easier to contemplate. Pro-rating costs keeping them in lines parallel will guide many who never went through the trying days of recession and adjustment."

Mr. Bard:

"PROBLEM of increasing productivity can be relieved by designing machine tools to operate at higher speeds. This will increase production per man hour, and reduce the number of machines required.

"One of the normally slower operations is the generation of gear teeth. First step to overcome this was the development of the shear-speed machine. A new, rigid high speed hobbing machine also provides, we believe, an entirely new concept as to possible machining speeds and feeds for the hobbing process. The machine has available spindle speeds up to 1000 rpm or more and infinitely variable hydraulic feed. The resultant 1300 sfpm with a 5-inch diameter hob has permitted production of two 3½ inch diameter, 9 pitch 2 inches wide 22 tooth helical gears in 58 seconds with multiple thread unground high speed steel hobs. And the produced profiles can be shaved accurately on conventional equipment. This is only one example of what can be done for productivity by increasing machine speeds."

Mr. Armstrong:

"DESPITE these hectic days, most machine tool manufacturers are making a concerted effort toward better and more efficient tools for the future. Most new designs will not be known until our economic and defense difficulties have been straigtened out.

"One builder has given much time and thought on turning problems in the aircraft industry and has developed a revolutionary lathe known as the 60-inch right

JOHN J. LADDEN

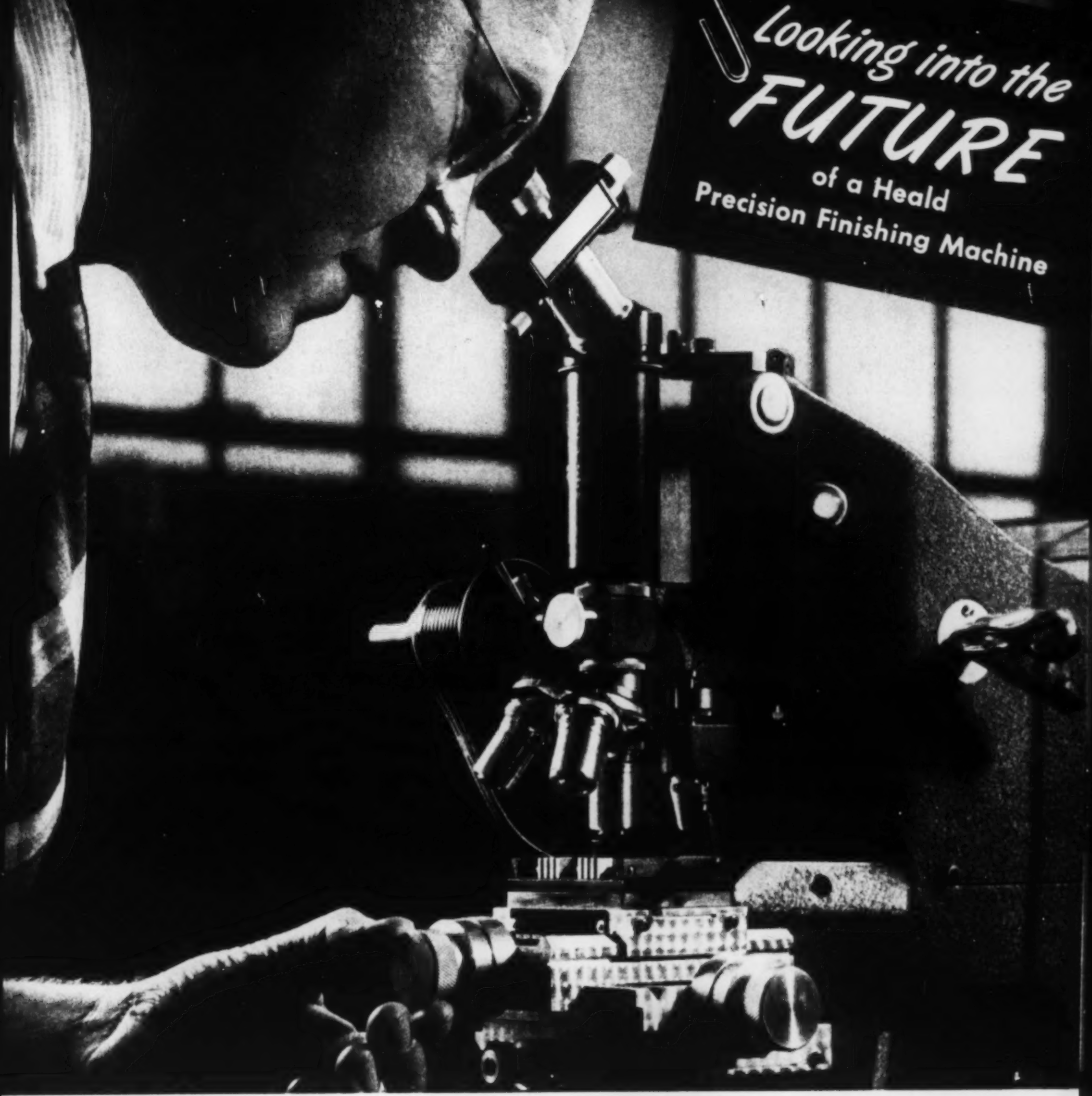
general manager, O. S. Walker Inc., Worcester, Mass.

O. L. BARD

president, Michigan Tool Co., Detroit

FRANK L. ARMSTRONG

president, Marshall & Huschart Machinery Co., Chicago



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MOST H.P. HOURS

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angle chucking lathe or T-lathe. The section on which the carriage is mounted is at right angles to the center line of the spindle, or at any angle for facing, straight or taper turning. Headstock spindle is furnished with 11½-inch hole permitting chucking of pieces with a shaft or other extension. Most parts are clamped on a large 54-inch face plate, an aluminum casting 5 inches thick.

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Mr. Yoch:

"SHARPLY accelerating activity of the defense program, particularly in tanks and other equipment involving low alloy steels and requiring unusual contour shaping operations, has brought about a new drive to adapt oxygen cutting and fabrication of such materials on a mass production basis.

"Fortunately, we have been able to capitalize on the wealth of proved experience obtained during World War II. We have available cutting procedures and techniques which can cope not only with the contour requirements, but with the standards of accuracy and

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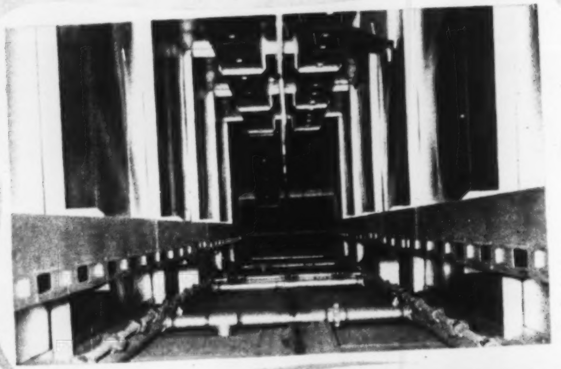
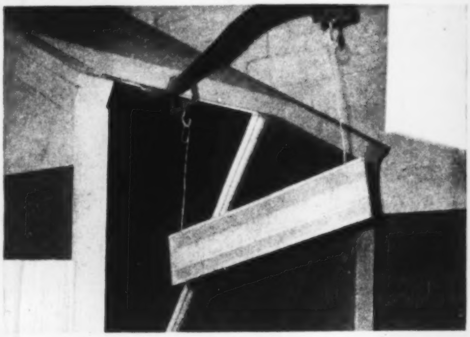
relies on GAS fired infra-red Paint Drying Oven for Metal Parts



27 Gas-fired ceramic burners on each side of 60-ft. long infra-red oven provide controlled temperatures of 100 to 600° F. Metal parts for processing are suspended from overhead track.



Suspended part is discharged from the Gas-fired infra-red oven.

THE production line of Dean Specialty Works, Inc., San Antonio, Texas, features a 60-foot Gas-fired infra-red drying and enamel baking oven. Known as an A-Type single pass paint drying oven, this Gas oven utilizes ceramic burners which yield the infra-red rays to dry wet-coated metal parts.

These clay burners, manufactured by Burdett Mfg. Co., Chicago, generate temperatures of 100-600° F., depending on baking cycle, pigments used, and color desired. Former baking methods used required more heat, and the enamel surfaces tended toward brittleness. With this modern Gas-fired infra-red equipment, heat is applied from the inside out, producing a coating which is virtually a part of the metal part.

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"Contours required by modern ordnance designs have led to the development of new and highly specialized cutting machine designs, one of which (known as the polygraph) can climb up and down hill, ride sideways."

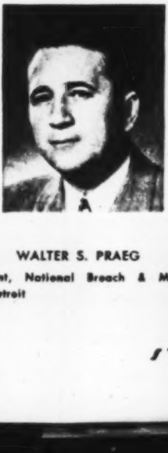
Mr. Praeg:

"WHEN urgent military necessity takes precedence, the designer is no longer hampered by compulsory economic compromises, but finds himself free to strive for ideal solutions to his problems. Thus, many new devices and improved processing are developed which ultimately are absorbed into American production practice.

"Latest development in gear practice is a gear shaving machine for correcting cutting errors and improving tooth surfaces of gears up to 100-inch PD. Another is a straight line loader to speed gear shaving by automatically transferring cluster gears from one machine to the next until all the gears of the cluster have been shaved. To be announced shortly is a new grinder for helical and spur gears and splines.

"Previous limitations in maximum allowable gear hardness for shaving can be materially extended by a new technique in shaving cutter production and the careful choice of gear materials with reference to their machinability.

"Research has shown that in



WALTER S. PRAEG
president, National Broach & Machine Co., Detroit

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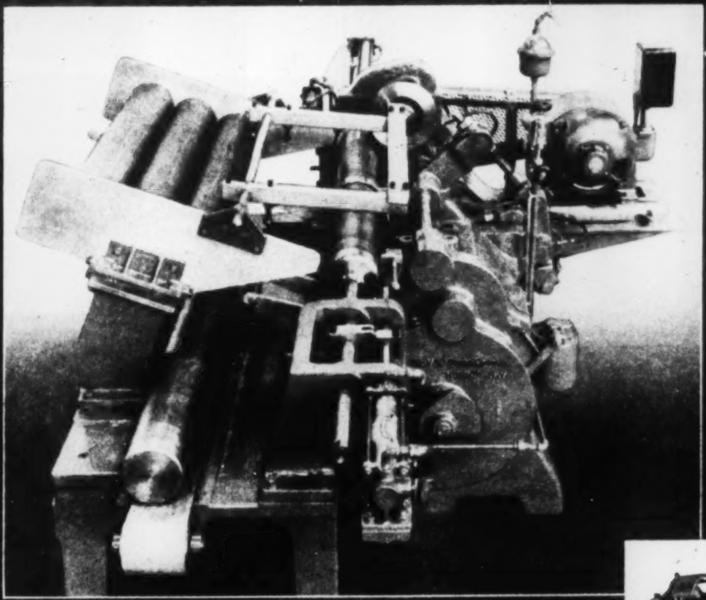

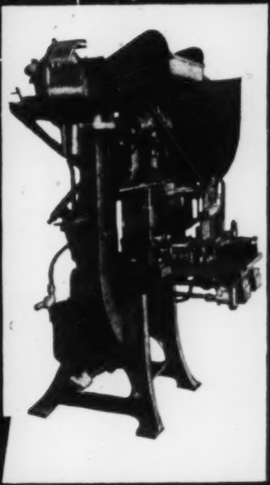

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the place of the scarce 18-4-1 steel, we can use molybdenum high speed for broaches and some shaving cutters without sacrificing quality or performance."

Mr. Bullard:

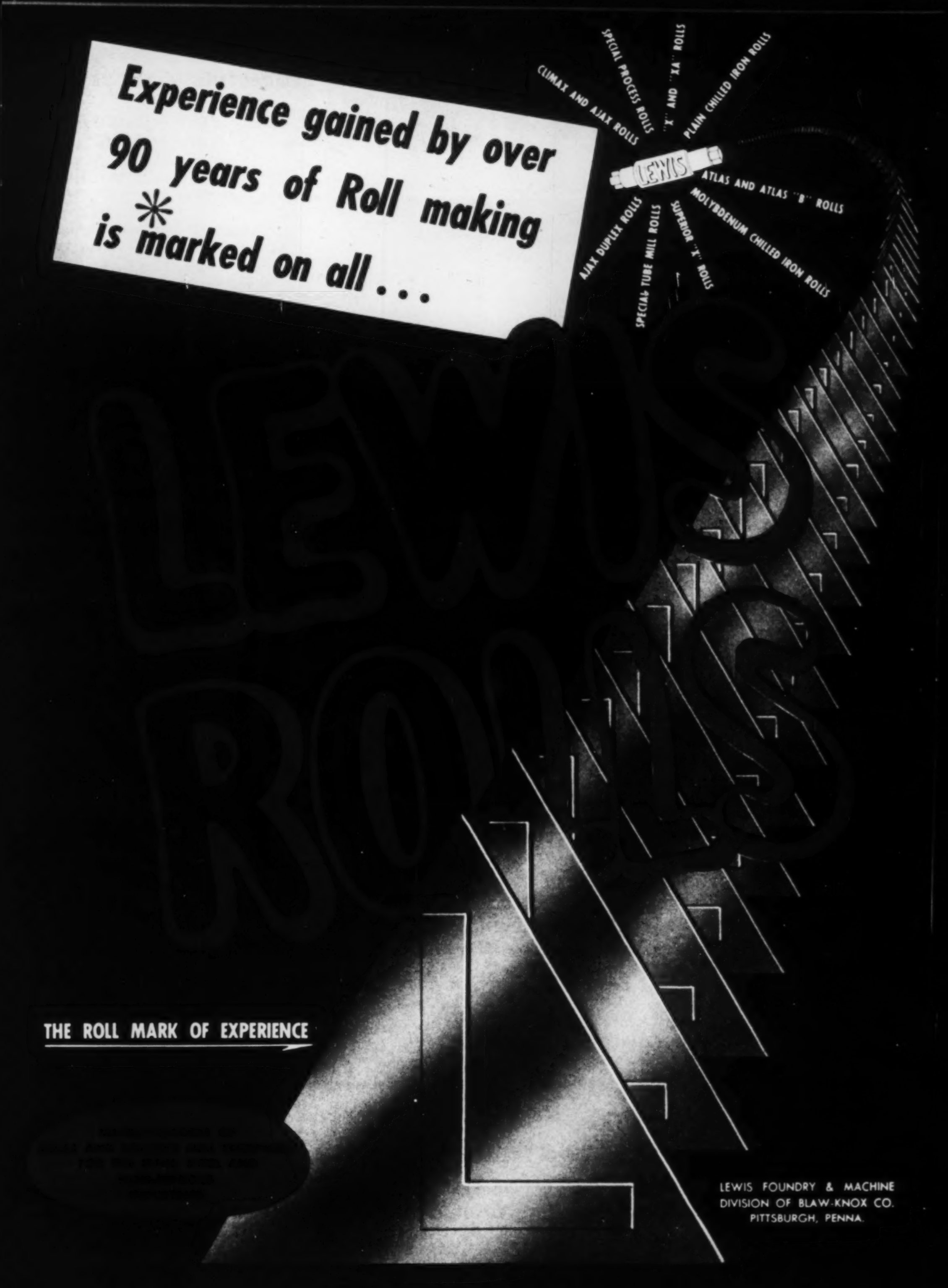
"IT has become increasingly evident that the latest automatically controlled vertical turret lathes are ideal for jet engine and other defense work. As an example, a standard two-ram head machine with angle turning attachments and indexing tool holders is being used for machining jet engine compressor cases. Close tolerance diameters, angles, T-type and plain grooves are machined inside where an operator cannot properly observe the cutting operations. This is most difficult and costly for manually operated machines since even the best operator must spend a high proportion of his working hours in trial cuts and measuring.

"With the new automatically controlled machines compressor cases can be machined identically at optimum feeds and speeds, never making errors and always machining parts at a predetermined rate of production.

"A new type of table carrier incorporates exceptionally high capacity anti-friction radial and thrust bearings. In addition to greatly increasing cutting capacity, this construction makes possible complete elimination of pits or basements under even the largest vertical turret lathes. Low

EDWARD C. BULLARD

president & general manager, Bullard Co., Bridgeport, Conn.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"Because intimate knowledge of the advantages and disadvantages of the three processes is required to properly evaluate the process, the tendency to specify a thread generating method on working drawings should be discouraged. Such an action on the part of a designer places a restriction on his own shop or on his supplier, which cannot, under present day conditions, be justified.

"Improvements which have been made in the design of thread cutting machines and die heads and chasers with materially improved metallurgical characteristics and which are available to the trade today, assure the maintenance of thread tolerances which could not have been accepted 10 years ago.

"Development of thread rolling attachments for automatic screw machines opens an entirely new field which easily can result in a complete retooling of automatic screw machines and the complete elimination of secondary threading operations on automatics.

GRAYSON M. STICKELL
vice president, Landis Machine Co., Waynesboro, Pa.

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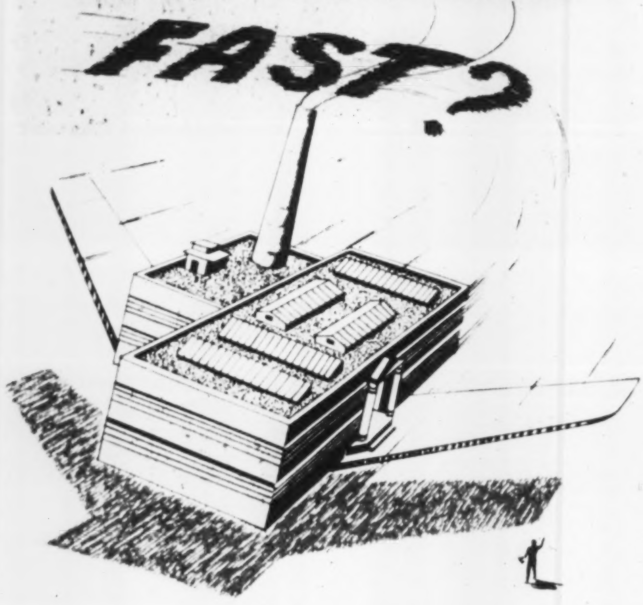

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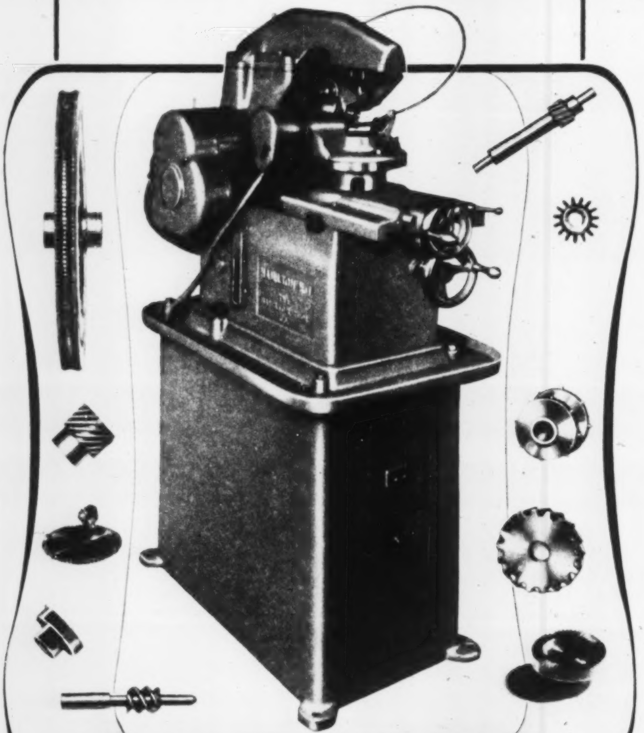


THE *Hamilton* TOOL COMPANY
[illegible] NINTH STREET • HAMILTON • OHIO • U • S • A

"Centerless thread grinding, which, up to this time, has been limited to the thread grinding of headless parts, will be broadened considerably by perfecting the infeed thread grinding process and on which considerable experimental work already has been completed. Some additional work remains to be done in this field before the process can be considered commercially successful."

Mr. Tone:

"NOTEWORTHY in the abrasive industry is increasing demand, particularly in the grinding wheel field, for closer tolerances in sizes, shapes and gradings. For example, internal grinders for small bearings call for mounted wheels used at speeds up to 100,000 rpm. Mandrel diameter tolerance is 3 ten thousandths inch, and concentricity of the abrasive and the mandrel itself have a tolerance of 2½ ten thousandths inch. Such tolerances have been unheard of in the abrasive industry.

"Users of abrasives are becoming more aware that a grinding wheel is a cutting tool with myriads of cutting teeth—rather than a 'disk of grit.' 'The cutting teeth' are abrasive grains of scientifically selected sizes, kinds, and quantity, are bonded with scientifically selected bonds and engineered to do specific operations.

"In coated abrasives, I consider the progressive development in 'contact wheels' most important.

FRANK J. TONE JR.
vice president, Carborundum Co., Niagara Falls, N. Y.

Through use of selected contact wheels on which the coated abrasive belt does its grinding and finishing work, results are roughly analogous to the selection of grade and bond for grinding wheels. These developments make it possible to substitute coated abrasives for bonded abrasives in many operations with a reduction in costs, labor, overhead and abrasives."

Mr. Sharpe:

"PROGRESS in machine tools during 1951 was largely in increased production rather than in new models. Unprecedented demand for machinery with skilled labor harder to find than ever have forced us all to seek new economies.

"Here at Brown & Sharpe, for example, we have conveyorized our screw machine assembly. Although the immediate motive was to increase capacity sharply, a desirable by-product has been increased efficiency in assembling these machines. Seventy men now turn out the same number of machines formerly requiring 100. Thirty highly skilled mechanics are thus immediately available for other work. Individual earnings for all have been unharmed or increased.

"Manufacturing time for certain main components has been simultaneously reduced from 12 weeks to about four, and for certain minor components from an average of 15 weeks to about nine. Installation of tumbling to replace hand filing and burring on about

HENRY D. SHARPE JR.

president, Brown & Sharpe Mfg. Co., Providence, R. I.

Tiny holes? . . . . . Easy!

Accurate holes? . . . . . Easy!

Holes on production schedules? . . . . . Easy!

Tiny, accurate holes on production schedules? . . . WOW!

Hamilton Drilling Machines can do it!
And withdraw the drill undamaged
from hole after hole after hole!

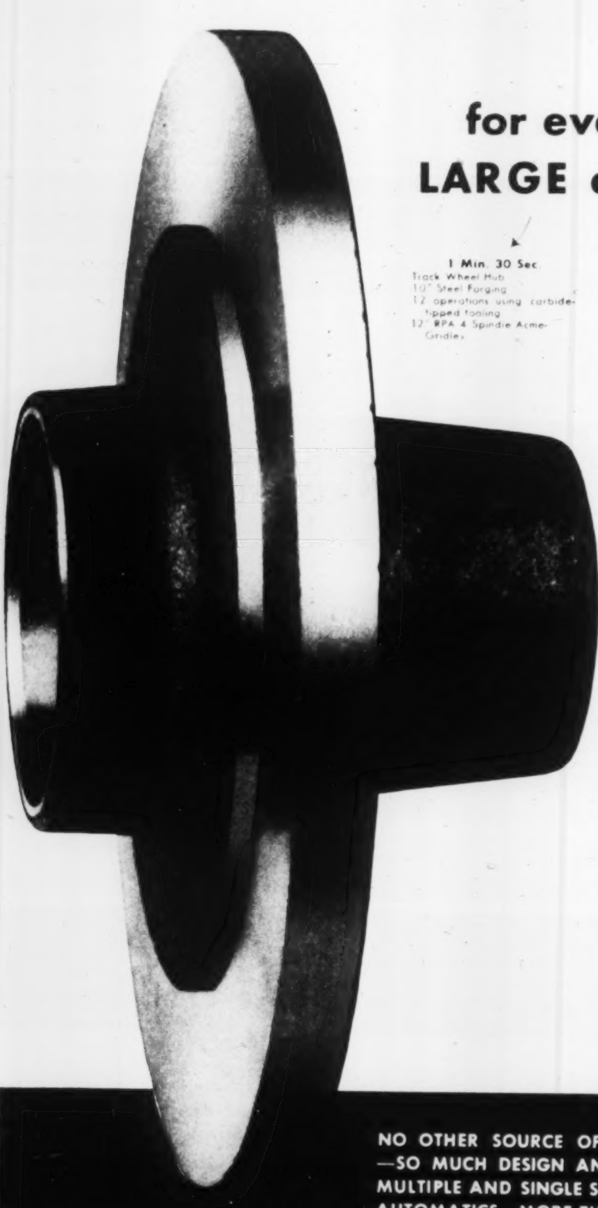
LEARN HOW!

Write for the series of Hamilton Drilling Machine Bulletins and Price Lists. (There is also a companion Tapping Machine. Shall we send that bulletin along with the others?)

Shown here is the Hamilton Varimatic, Super Sensitive, Variable Speed, Small Hole Drilling Machine, one of four models, each particularly adapted to the work for which intended, all equally precise.

THE *Hamilton* TOOL COMPANY
848 SO. NINTH STREET • HAMILTON • OHIO • U • S • A

CHECK YOUR CHUCKER JOB



for every size
LARGE or SMALL

1 Min. 30 Sec.
Track Wheel Hub
10" Steel Forging
12 operations using carbide-tipped tooling
12" RPA 4 Spindle Acme-Gridley

Less Than 10 Sec.
Aircraft Fitting
11 operations
Class 3 Pressure-tight threads, and near-perfect concentricity of bevel and straight surfaces
5¼" RAC 6 Spindle Acme-Gridley with Vers-O Tools

you'll save with ACME-GRIDLEY AUTOMATICS

Our files are full of other actual, customer-authenticated case histories showing savings of 20%, 30%, 50% and even up to 80%. Available in 4,6 and 8 spindle styles, for capacities up to 12". Acme-Gridley chuckers give you "more good pieces in the pan at the end of the day". For more complete details, ask for Bulletin CM-43.

NO OTHER SOURCE OFFERS A LINE SO COMPLETE —SO MUCH DESIGN AND TOOLING EXPERIENCE IN MULTIPLE AND SINGLE SPINDLE BAR AND CHUCKING AUTOMATICS—MORE THAN 45,000 MACHINES BUILT.

COSTS THESE 3 WAYS:

√ PRODUCTION

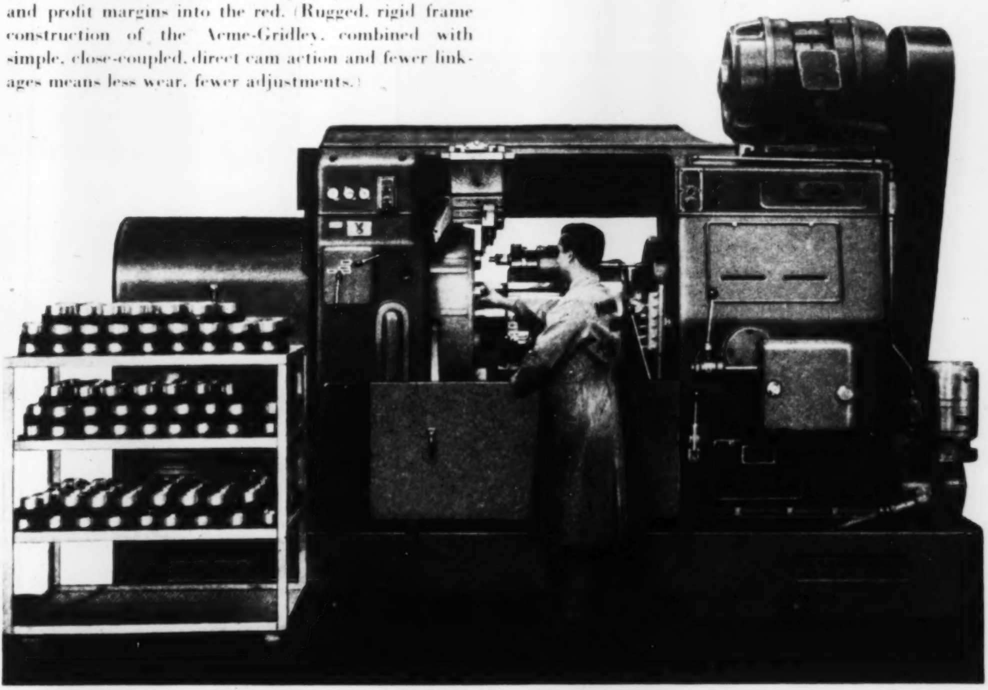
—Floor-to-floor machining time takes on added significance as hourly wage rates go up. Are you sure you're getting top performance from your present machines? (Acme-Gridleys are built to perform at the highest spindle speeds and fastest feeds modern cutting tools can withstand.)

√ ACCURACY

—Unless your chuckers are built to deliver accurate, dependable, 'round-the-clock production, with a minimum of down time, rejects can quickly run your costs and profit margins into the red. (Rugged, rigid frame construction of the Acme-Gridley, combined with simple, close-coupled, direct cam action and fewer linkages means less wear, fewer adjustments.)

√ TOOLING

—Complicated single-purpose tooling required on some chuckers to make production guarantees can add needless expense to machining costs—two ways. You pay more for tooling and you pay more for set-up time. Be sure your chucker is *versatile.* (Acme-Gridleys combine simplicity of operation with multi-purpose standard tools, and the ability to use economical power driven auxiliaries—often eliminating costly second operations.)



The NATIONAL ACME CO.

170 EAST 131st STREET · CLEVELAND 8, OHIO

Acme-Gridley Bar and Chucking Automatics: 1-4-6 and 8 Spindle · Hydraulic Thread Rolling Machines · Automatic Threading Dies and Taps · The Chronolog · Limit, Motor Starter and Control Station Switches · Solenoids Centrifuges · Contract Manufacturing

How to insure
Power Driven Equipment

Agitators or blowers, conveyors or elevators, printing presses or pumps — it's all the same no matter what you make. When power transmission fails, your whole machine or equipment gets blamed. It's *your* reputation as the primary equipment builder that suffers the loss.

As a safeguard, increasing numbers of design engineers are specifying Winsmith Speed Reducers. They know by reputation and experience that Winsmith can be depended upon . . . that each of their machines so equipped leaves their plant with power transmission unexcelled. They know also, that the Winsmith nameplate is a positive selling point — a mark of merit that has industry-wide recognition for top quality engineering and fabrication.

In selecting a speed reducer within the 1/100 to 85 h.p. range for *your* machines or equipment, profit from the experience of others. Select the one that is on the approved list of the world's most highly regarded companies — Winsmith.

For all the facts, request "Save Through Standardization" Folder.

WINSMITH
SPEED REDUCERS

WINSMITH, Inc.
14 EATON STREET
Springville (Erie County), N.Y.

50 per cent of our burring jobs has enabled one man to do work formerly requiring seven. Thus, we have 'pulled skilled manpower out of the sky' and helped ourselves greatly increase production."

Mr. Connor:

"INCREASED production and reduced costs come from making full use of the right equipment for each job. In many cases the number of operations, the amount of equipment and manpower required to process a surface, can be materially reduced if the full potential of every process is realized.

"One major aircraft engine manufacturer hones over 300 surfaces, holding close tolerances in geometric accuracy, size and finish. Finish is of particular importance because any scratches, cracks or weakening of the surface promotes fatigue failure.

"As much as 0.020-inch of stock is left for removal by honing. Number of operations is reduced to a minimum by making full use of modern honing techniques. Required precision tolerances are generated in one honing operation. Honing removes stock rapidly and efficiently from even the hardest of materials. Bores are made straight and round, size is held automatically, and any desired surface finish is generated and duplicated in every part. This one operation corrects all errors left by previous operations as it removes all stress, amorphous and

KIRKE W. CONNOR
president, Micromatic Hone Co., Detroit

IN ALL INDUSTRIES

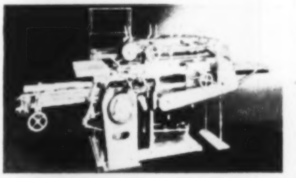
LUBRIPLATE LUBRICANTS

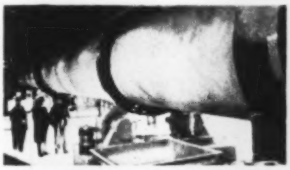
EXCEL IN REDUCING FRICTION, WEAR, UPKEEP-COSTS AND POWER-CONSUMPTION . . . WITH BETTER MACHINE PERFORMANCE

PACKAGE MACHINERY COMPANY of Springfield, Mass., says:

"WE RECOMMEND THIS LUBRICANT TO OUR CUSTOMERS"

"We have found LUBRIPLATE Lubricants to be very effective and use them extensively in our machines. To assure the proper use of LUBRIPLATE Lubricants for re-lubrication, we place tags on our machines before shipment. Thus the purchasers of those machines know the LUBRIPLATE Product we recommend for each application and where to obtain it."





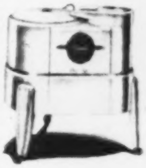
The BROWN COMPANY, Quality Paper Makers of Berlin, New Hampshire, says:

"THIS LUBRICANT SAVED US $2,098.16 IN SEVEN MONTHS"

"During the seven month period before using LUBRIPLATE No. 130AA in the bearings of our Kraft Mill Lime Kiln, we used a conventional oil of the density recommended. The cost of the lubricant for the period was $2,134.00. In the seven months that followed, we only used 128 lbs. of LUBRIPLATE No. 130AA for initial filling and replacement at a cost of $35.84. LUBRIPLATE No. 130AA only requires weekly application whereas the former lubricant required daily application."

"THIS LUBRICANT SAVES GEARS AND TRANSMISSIONS"

-says AUTOMATIC WASHER COMPANY, Newton, Iowa



"We have used LUBRIPLATE in our washing machine transmissions since 1933. Our laboratory tests as well as field experience indicate that through the use of LUBRIPLATE, we reduced the wear on the gears and prolonged the life of the transmission. The transmission is the heart of any washing machine and the long life and trouble-free performance obtained by the use of LUBRIPLATE in the Automatic Washer transmission has been an important factor in the success of our product."

F. Breckenridge
Executive Vice President

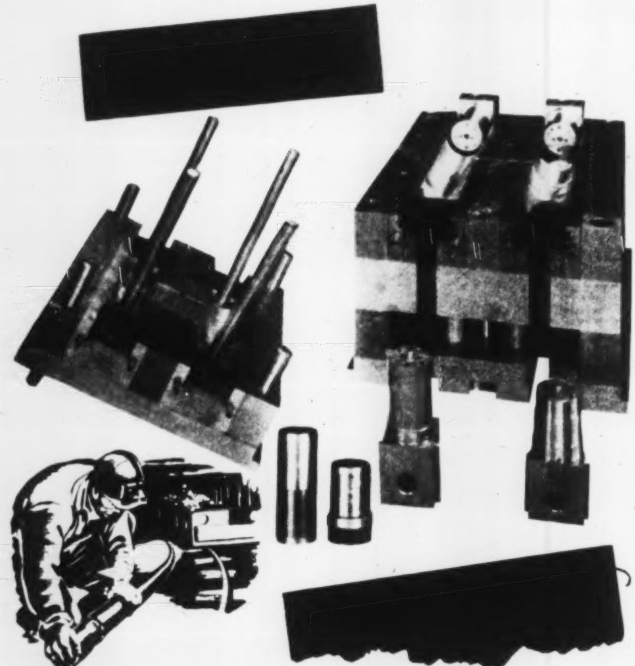
Net Weight 25 lbs.
"It's the Film"
Made in U.S.A.
PREVENTS WEAR AND CORROSION
LUBRIPLATE
SUPER-LUBRICATION
FISKE BROTHERS REFINING CO
NEWARK, N.J.
TOLEDO, OHIO

REGARDLESS OF TYPE AND SIZE OF YOUR MACHINERY LUBRIPLATE LUBRICANTS IMPROVE OPERATION AND GREATLY REDUCE MAINTENANCE COSTS.

Write today for LUBRIPLATE Data Book No. 1-52

LUBRIPLATE DIVISION
Fiske Brothers Refining Co.
Newark 5, N. J. Toledo 5, Ohio

DEALERS FROM COAST TO COAST—SEE YOUR CLASSIFIED TELEPHONE BOOK

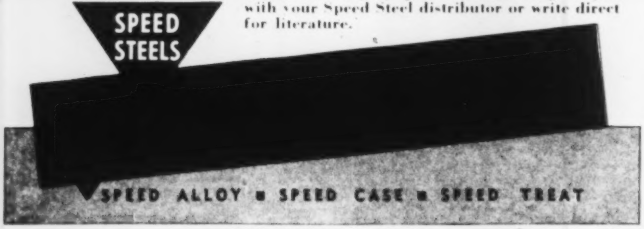


How All Three Speed Steels Make Plastic Pipe More "Flexible"

Carlon is a plastic pipe used to transmit fluids and vapors over irregular surfaces. This Speed Steel Mold—using Holliday's Speed Case (X1515), Speed Treat (X1545) and Speed Alloy hot rolled alloy plate steel helps make Carlon even more "flexible". It molds 6" dia. threaded plastic couplings that join either long lengths of Carlon to Carlon or Carlon to standard metal pipe.

Naturally, these couplings have to be near-perfect to prevent leakage. Carlon Products Corp. reports top distortion-free production at the rate of one shot per minute. Houk Machine Company, Barberton, Ohio who made the mold of Speed Steels for Carlon, reports 40% faster machining than regular hot rolled carbon or tool steels plus an absence of warpage and distortion and longer tool life. Top and bottom plates are of ground Speed Treat plate, male and female core are of Speed Case carburized to Rockwell 55 "C" then ground to size. Other parts are of Speed Alloy.

How versatile Speed Steels are solving new fabricating problems every day makes mighty profitable listening. Check with your Speed Steel distributor or write direct for literature.


SPEED STEELS
SPEED ALLOY ■ SPEED CASE ■ SPEED TREAT

DISTRIBUTED BY

Brown Wales Co., Boston Hartford Lewiston, Me ■ Bridgeport Steel Co., Bridgeport, Conn. Beals, McCarthy & Rogers, Buffalo, N. Y. ■ Burger Iron Co., Akron, Ohio ■ Grammer, Dempsey & Hudson, Inc., Newark, N. J. ■ Earle M. Jorgensen Co., Los Angeles-Houston-Oakland-Dallas ■ Passaic County Steel Service, Inc., Paterson, N. J. ■ Peckover's Ltd., Halifax-Montreal-Toronto-Winnipeg-Vancouver ■ Peninsular Steel Co., Detroit, Mich. Pidgeon-Thomas Iron Co., Memphis, Tenn. ■ Horace T. Potts Co., Philadelphia-Baltimore

Produced by W. J. Holliday & Co., Inc., Speed Steel Plate Division, Hammond, Indiana. Plants: Hammond and Indianapolis, Indiana

smear metal on the surface of the part. This is smart processing."

Mr. Kraut:

"SOME of the most important developments in machine tool design stem from the increasing stress being placed on machining of light metals in the aircraft industry. Coupled with the necessary high machining speeds and feeds is the increased importance of tracer control.

"Our recent trend is to a greater use of steel weldments in the construction of large machines. This permits lighter construction of moving members, important in tracer control units. Also steel weldments provide increased rigidity as well as added flexibility in design. Non-metallic way surfaces are being used to an increased extent which eliminates the necessity of using cast iron.

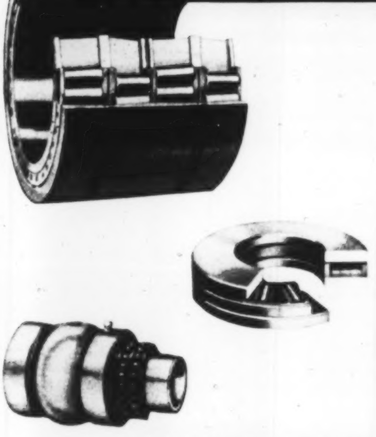
"Major problem today is increasing production of machine tools for defense. Pool order and facilities contracts are slow in being consummated. The government's hard and fast rule of no expenditures for brick and mortar has held back plant expansion. Subcontracting arrangements have been difficult to conclude in any major program principally because of the 'doing business as usual' attitude.

"The future is not all dark, however, and there is proof that the machine tool industry is doing a splendid job under present difficulties. From figures available at

RALPH J. KRAUT

pres. & gen. mgr., Giddings & Lewis Machine Tool Co., Fond du Lac, Wis.

made to order...
RF



Solving special friction problems is an everyday job with Torrington. Designing and producing made-to-order bearings has been an important part of our business for years.

This extensive experience has included all types of anti-friction bearings . . . both small and large . . . and for use in virtually every type of equipment. Result: Torrington can give you an impartial recommendation tailored to *your* application.

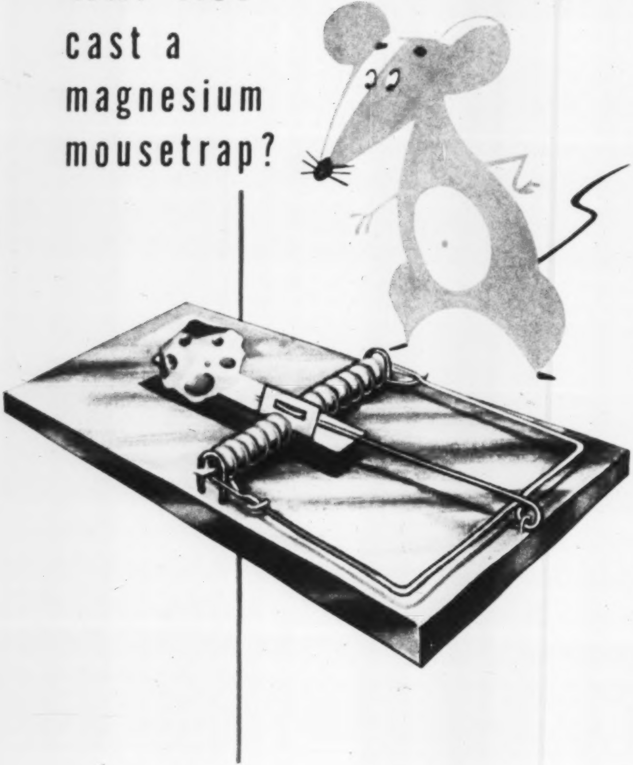
Whether you are a builder or user of machinery requiring bearings, Torrington engineers will gladly work with you in selecting a standard—or designing a special bearing tailored to your needs.

THE TORRINGTON COMPANY
South Bend 21, Ind. Torrington, Conn.
District Offices and Distributors in Principal Cities of United States and Canada

TORRINGTON BEARINGS

Spherical Roller • Tapered Roller • Straight Roller • Needle • Ball • Needle Rollers

WHY NOT
cast a
magnesium
mousetrap?



Maybe it IS a lousy idea

On the other hand, maybe it's as practical as using cheese for bait.

Frankly, we haven't gotten out a slide rule or put our thinking cap on tight, to figure it out one way or the other. Maybe the mice wouldn't go for it.

But we do know a lot of things WILL be cast in magnesium or aluminum after military requirements are satisfied.

A lot of things no one ever thought would be.

So whatever your plans are, whatever directions they might take, whatever products you might have on scraps of paper, in preliminary drawings, or just plain ideas-on-the-brain ... keep an open mind in terms of magnesium or aluminum in sand cast, semi-permanent or permanent mold form.

Particularly Well-Cast castings.

Naturally.

Well-Made Wood and Metal Patterns • Ampco Bronze Castings

Almost a Half-century of Experience

THE WELLMAN BRONZE & ALUMINUM CO.

2521 EAST 93rd STREET • CLEVELAND 4, OHIO

this time, it appears that shipments for the year 1951 will double those of 1950. Many subcontracting and other expansion programs are getting under way, and I am confident that with prompt Government action to clear up some of the present delays and materials shortages, the machine tool industry during 1952 will uphold its part in the defense program."

Mr. Newton:

"THERE are three major trends in machine tool development today: 1. Greater speed and accuracy; 2. More massive and rigid construction; 3. Increasing use of automatic or electronic control.

"All three are influencing current designs. Columns, rails and heads are being designed heavier to withstand greater machining stresses. Cutting speeds are being increased, as tools which permit higher machining speeds become available. Controls are constantly being simplified.

"Example of precision control is illustrated through a 78-inch stroke slotter. Work up to 55 tons in weight can be traversed, or fed in increments as low as 0.005-inch. Longitudinal or rotary feed, as well as rapid traverse controls, are available from the pendant station.

"Hydraulic duplicators are being applied to planers, shapers and slotters for a variety of contours. A battery of large planers have been specially designed to machine a complex airfoil section. Two cut-

H. R. NEWTON

president, Rockford Machine Tool Co., Rockford, Ill.

Ford

boosts machine output 4 times

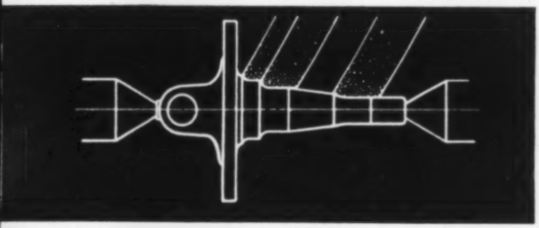
Grinding Operations Combined by Grinding 3 Diameters and 3 Blending Radii in One Operation

- **Less machine investment**
- **Production costs reduced**

Seven LANDIS TOOL 14" x 18" Type CH Plain Grinders with new overhead profile wheel dresser and wheel base set at 30°. These machines in FORD Mound Road Plant have released manpower for more vital jobs.

work data

Name of Part—Front Wheel Spindle
Pieces per Hour—90
Machine—Type CH Plain Grinder with Angle Wheel Base
Stock Removal—.015" on diameter
.009" on faces
Limits—.0005" on diameter
.010" on radius
Material—Steel Forging



LANDIS

precision grinders

LANDIS TOOL COMPANY WAYNESBORO, PENNA., U. S. A.

ting tools, working from one master, follow the variable form of the work, as the cut progresses. The operator has only to set tools and check the work."

Mr. Merchant:

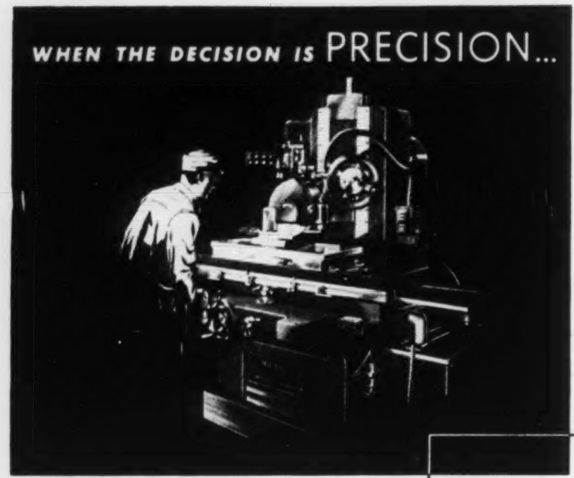
"IMPORTANT advance in the machining and grinding field was the development of basic theory dealing with the mechanics and geometry of chip formation by individual grits in a grinding wheel, and the relation of this to the overall action of the grinding wheel and to the properties of the material being ground. Another field of fundamental knowledge in which important advances were made was that of the temperatures and heat conditions in tool, chip and workpiece in machining and grinding. Hand-in-hand with this went increased practical application of such knowledge.

"Radioactive tracers are now applied to the rapid measurement of tool wear in machining. In this, the cutting tool is made radioactive and its rate of wear determined by measuring with a Geiger counter the radioactivity of the chips due to the metal worn from the tool. This method gives promise of great savings in time and materials in the all-important job determining tool life and tool wear under different machining conditions and with different materials and cutting fluids.

"Much progress was made in 1951 in developing information on

EUGENE MERCHANT

senior research physicist, Cincinnati Milling Machine Co., Cincinnati



Where extreme tolerances are not required, the choice of any particular grinding machine may not be too important. But, where absolute precision is demanded, the choice is usually *Grand Rapids*.

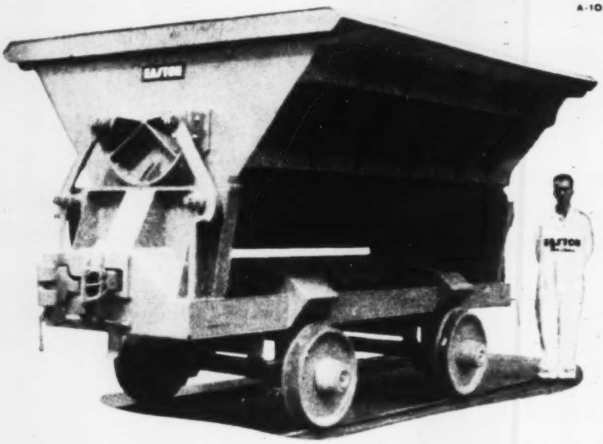
Defense orders make it impossible to fill orders as quickly as we desire—but we know our customers can appreciate the reasons for delay. As always we'll do our best to serve you.

GALLMEYER & LIVINGSTON CO.
307 Straight Ave., Grand Rapids, Mich.

Grand Rapids Grinders
—World's finest

GALLMEYER & LIVINGSTON

A-1025



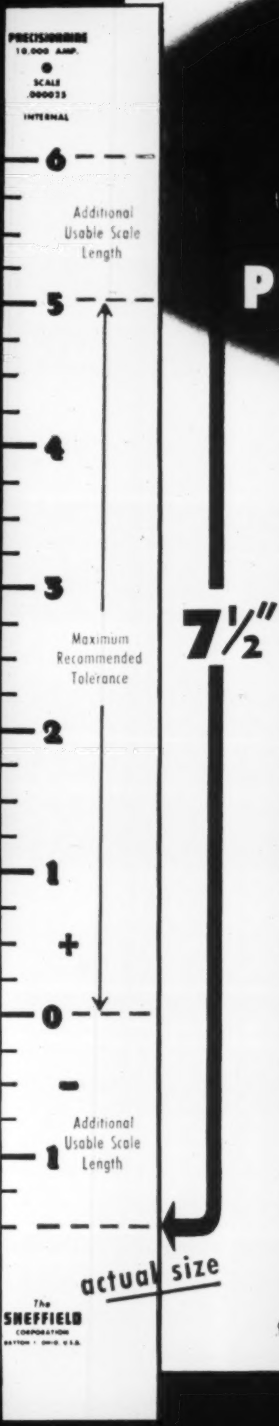
EASTON ...a dependable design and construction service in industrial cars

EASTON CAR & CONSTRUCTION COMPANY · EASTON, PA. · NEW YORK · PHILADELPHIA · PITTSBURGH

Twice as much Usable Scale Length plus

SHEFFIELD COLUMN PRECISIONAIRE

PRECISIONAIRE
SHEFFIELD


PRECISIONAIRE
10,000 AMP.
SCALE
.000025
INTERNAL
6
Additional Usable Scale Length
5
4
3
Maximum Recommended Tolerance
2
1
+
0
-
Additional Usable Scale Length
1
7½"
actual size
The SHEFFIELD CORPORATION DAYTON 1, OHIO, U.S.A.

7½ inches of usable scale length—*more than twice as much as most other air gages.*

MANY MORE CLASSIFICATIONS—more selections can be made because of the extra scale length—manufacturing tolerances can be widened to save time and cost without sacrificing quality.

SHOWS *HOW MUCH* PARTS ARE OUT—especially advantageous where parts are coming consistently on the borderline or just outside tolerance limits.

BETTER FOR BRINGING TO SIZE—Readings can be taken earlier when approaching size so that the operator is sure of not going beyond tolerance, in fact, he can accurately work to desired limits *within* the tolerance zone.

CLOSER MACHINE CONTROL—with greater scale length the trend of the machine and tooling to go out of control *shows up sooner*, reducing possibility of rejects.

MORE ACCURATE QUALITY CONTROL CHARTS—the column Precisionaire scale is a running quality control chart in itself. Readings can be transferred to a chart with greatest accuracy.

OPERATORS LIKE THE LONG SCALE—with higher amplifications the spread for the tolerance and each classification is wider, making the operator's job easier.

MODEL NUMBER	MAXIMUM RECOMMENDED TOLERANCE	MINIMUM USABLE SCALE LENGTH BEYOND TOLERANCE LIMITS
1,000	.005	.0025
2,000	.0025	.0013
5,000	.001	.0005
10,000	.0005	.00025
20,000	.00025	.000125

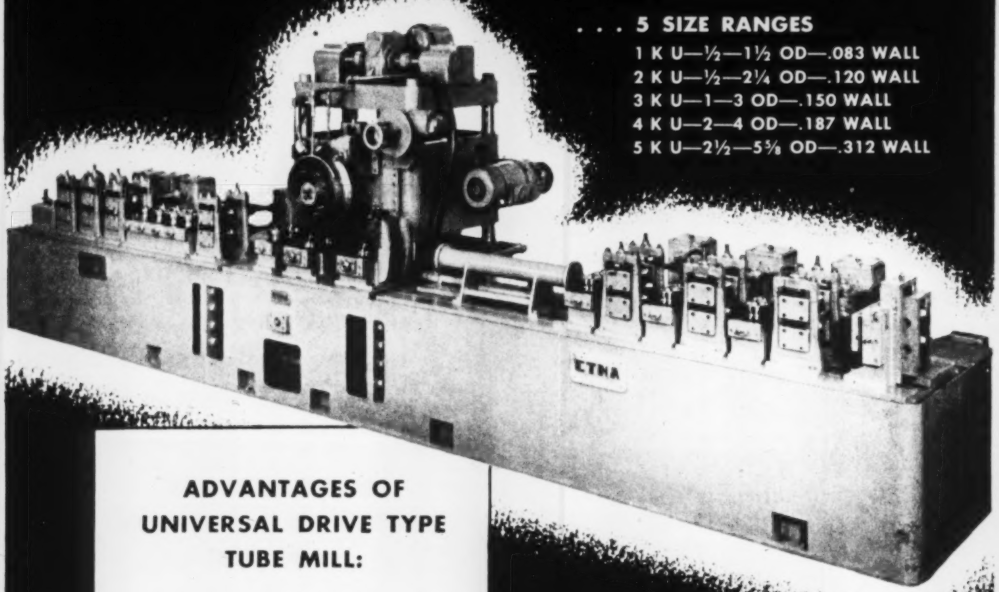
PHONE, WIRE, OR WRITE CUSTOMER CONSULTATION FOR DEMONSTRATION IN YOUR PLANT. CATALOGS CAN BE SENT AT ONCE.

the *Sheffield* corporation
DAYTON 1, OHIO, U.S.A.

Announcing ETNA
Universal Drive Type Tube Mills

. . . 5 SIZE RANGES

1 K U—½—1½ OD—.083 WALL
2 K U—½—2¼ OD—.120 WALL
3 K U—1—3 OD—.150 WALL
4 K U—2—4 OD—.187 WALL
5 K U—2½—5⅝ OD—.312 WALL



ADVANTAGES OF UNIVERSAL DRIVE TYPE TUBE MILL:

1. Adaptability to Roll Methods
2. Adjustable Lower Spindle
3. Fast Changeover
4. Completely Sealed Gearing

Send new Etna circular giving mechanical and electrical specifications of the Etna Tube Mill to:

Name..................Title............

Company..............................

City and State..........................

The
ETNA
MACHINE CO.

3500 Maplewood Ave.
TOLEDO 10, OHIO

ROTARY SWAGERS . . . TUBE MILLS
TUBE CUT-OFF MACHINES

the practical machining of titanium metal, and some progress was made toward solving the still severe practical problems involved in grinding this material. Considerable progress was also made in developing and applying basic information on the use, in practice, of high rake angle (30-35 degree) high-speed steel cutters in milling steel."

Mr. Wilkie:

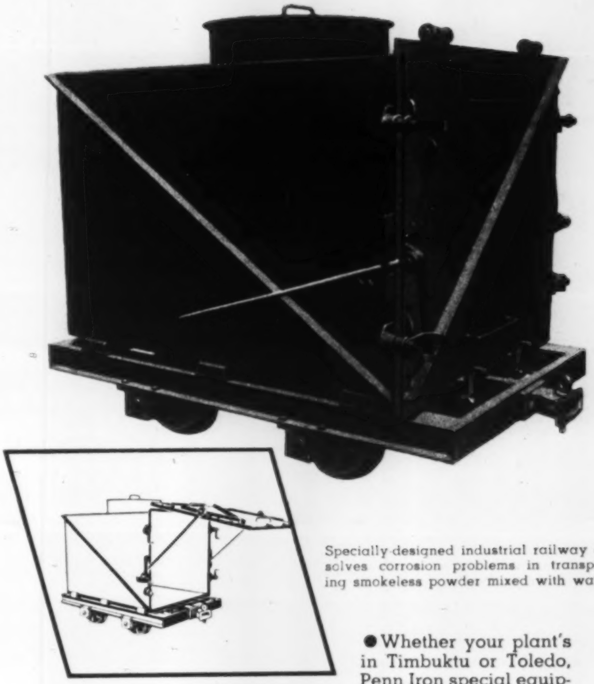
"HISTORY has witnessed many changes in man's aims, desires, and accomplishments in things material. We live at a time in world affairs when the level of our national safety, as well as national economy, is determined by the tempo of mass production.

"Many new and compelling questions, economic as well as sociological, have materialized as a result of the industrial and social revolution throughout the world. These problems well may require attention as great as that being given to things technological.

"To this end they need the backing of private enterprise organizations with idealistic motives.

"One important problem is greater understanding of the machine age. There is very little knowledge amongst the average man as to the extreme importance of machine tools. Organizations, such as the National Association of Manufacturers and the American Economic Foundation are carrying on very effective campaigns

LEIGHTON A. WILKIE
chairman, DoAll Co.,
Des Plaines, Ill.



Cut Costs in Your Plant with

PENN IRON SPECIAL HANDLING EQUIPMENT

Specially-designed industrial railway car solves corrosion problems in transporting smokeless powder mixed with water.

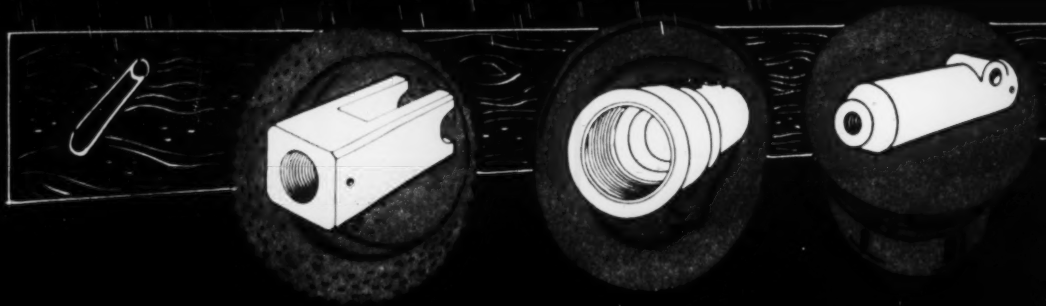
● Whether your plant's in Timbuktu or Toledo, Penn Iron special equipment can *profitably* solve your materials handling problems. For example, this industrial railway car, specially designed for the Chinese Nationalist government on Formosa, is fabricated of stainless clad steel to last longer and require less maintenance in transporting a highly corrosive product.

On job after job, Penn Iron has proved it can improve handling operations . . . simply by designing a more practical handling vehicle. We'll be glad to analyze your materials handling problem at no obligation. To save time, cut costs and boost output, drop us a line for more information, now.

MEMBER FEMA

PENN IRON WORKS, INC.
READING, PENNSYLVANIA

a thousand jobs



One of the lathe line-ups at the C. B. Christiansen Machine Shop, Newark, New Jersey. In this shop you'll find 2 Heavy Duty Engine Lathes, 10 Regals, 1 Sliding Bed Gap Lathe and 1 Rapid Production Lathe . . . all LeBlonds! Recent jobs ranged from a 67" diameter ring gear down to "57 varieties" of "watch-charm" work.

for quick-change artists

Run a job shop with a quality reputation and you'll have to depend on your lathes 100% to turn out your work fast, to tolerance, with profit. Those lathes have to be "quick-change artists"! That's why Christiansen operates 14 LeBlonds. With plenty of new jobs to attack each day, they have found LeBlond Lathes smart business investments.

As Don Phillips of LeBlond's New York Office puts it, "It's pretty hard for anyone except LeBlond to have such all-around satisfied customers as Christiansen. That's the advantage of our complete line. No matter what kind of turning Christiansen's business calls for, one of our standard LeBlond Lathes fills the bill exactly.

"LeBlond men never have to recommend an 'almost-right' lathe simply to get the order. That's where our customers' confidence in LeBlond really starts." Experienced lathe buyers know this to be true. From the 13" Regal to the largest Automatic Crankshaft Lathe, LeBlonds are easiest to select, easiest to apply with certainty to a specific job . . . and the surest producers of profitable metal turning. Call in your LeBlond Distributor, or write Cincinnati. Start now. Learn what that "confidence" Don Phillips mentioned can mean to you.

THE R. K. LEBLOND MACHINE TOOL COMPANY, CINCINNATI 8, OHIO

Ask for Catalog G
to find the right
lathe for your job.

turned faster by

LeBLOND
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WORLD'S LARGEST BUILDER OF A COMPLETE LINE OF LATHES • *FOR MORE THAN 64 YEARS* to teach the fundamentals of our economy. It is becoming increasingly important for industry to dedicate a portion of its income and talent to such programs."

Mr. Brockman:

"STARTING from scratch a few months ago we developed a new turbine-wheel lathe with either an automatic or manually operated cycle to meet practically all conditions so far encountered in the jet engine program.

"This short bed machine has a relatively large swing and is designed primarily for automatically profile facing disks, or wheels, such as found in General Electric and Sapphire jet engine compressors.

"When equipped with reversing type electrical equipment, a reversing feed box and hydraulic duplicating attachment, the machine can be set up to profile face from the front to the center, at which point the spindle and feed direction is automatically reversed, causing the tool to continue feeding from center to rear. Spindle speed is automatically varied during the entire cut so as to approach a constant cutting speed.

"At end of the cut, the tracer slide automatically retracts, the cross slide returns to starting position and the machine stops. All functions are controlled electrically through limit switch actuated by trip dogs. Feed and rapid traverse may be engaged and disengaged at any point in the cycle by

B. N. BROCKMAN

V. P. & sales mgr., R. K. LeBlond Machine Tool Co., Cincinnati

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READY-POWER DRIVE

for Full Efficiency ALL THE TIME!

Only Ready-Power gives your electric trucks full efficiency for every minute of every hour . . . all day long. And because Ready-Power-equipped trucks are so easy to operate, drivers are more efficient, too. Unlimited power plus alert drivers add up to more ton-miles per hour.

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Manufacturers of Gas and Diesel Engine-Driven Generators and Air Conditioning Units, Gas and Diesel Electric Power Units for Industrial Trucks

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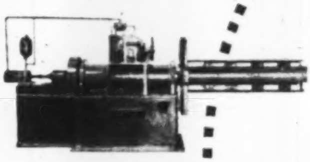
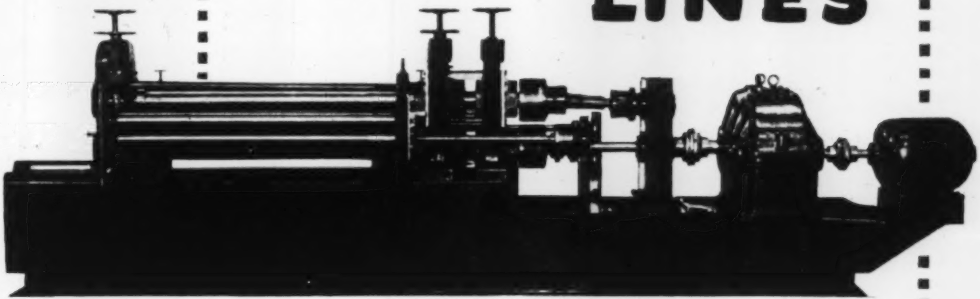
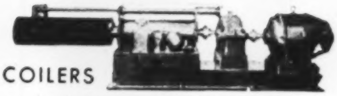
HEAVY-DUTY *Slitting* LINES



PAY-OFF REELS



SLITTERS



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SCRAP WINDERS
SCRAP CHOPPERS

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2800 ft. E.W. runway and club house, private field 2 miles west of Salem, maintained for your convenience. Wire or phone arrival time. We will meet your plane.

Complete PAXSON lines are setting performance records—*coast to coast*

Paxson Slitters are proving their efficiency for the toughest jobs, such as cutting heavy wall tubing stock and other heavy-duty slitting. Capacities up to 40,000 lb. coils. Various power, to meet requirements up to 1½" total metal thickness. Paxson also builds general duty lines.

Whatever your slitting requirements — contact Paxson.

PAXSON MACHINE CO.

SALEM • OHIO

Engineers and Builders of Cold-Rolled Strip-Mill Equipment
SPECIALIZING IN SLITTING LINES

REMEMBER, ALL PAXSON LINES ARE CUSTOM BUILT

4

adding or modifying the trip dogs. The manually operated machine is basically the same as the automatic except that all functions are controlled manually and the variable spindle speed feature is not furnished."

Mr. Chapin:

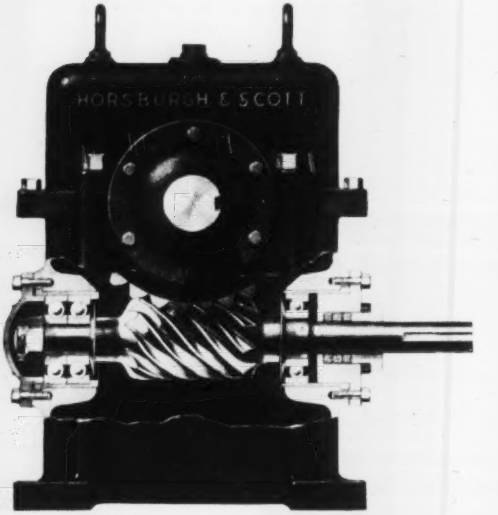
"TO say that the man-hour cost for machine operations is increasingly disproportionate to the machine owner's investment is no longer news to any manufacturer. And to assume there is no limit to what buyers will pay for a machine made product is to invite business disaster.

"To reconcile these premises there is but one answer: Employ machines which are not only automatic, but provide tooling facilities and attachments which perform many of the so-called extra operations that otherwise must be done on secondary machines which multiply costs for manpower, for machine investment and valuable floor space. As a case in point, we furnished five multiple spindle automatics requiring five operators and one tool setter to perform the same amount and quality of work formerly done on a variety of machines and requiring 57 operators plus supervision. This released 51 men for jobs in the same plant.

"An entirely new single spindle automatic features independent travel of each of its five end and three side toolslides and three automatic spindle speed ranges with

FRED H. CHAPIN

president, National Acme Co., Cleveland



efficient, long life . . .

WORM GEAR SPEED REDUCERS

by Horsburgh & Scott

Every modern element for reducing friction and other losses is incorporated in these reducers...hardened and accurately ground worm made from special case hardening steel, accurately made gear from chilled bronze to H & S specifications, anti-friction bearings, accurate alignment, smooth streamline interiors and proper lubrication. Due to its glass hardness, worm wear is nil...due to its accuracy, gear wear is negligible. Throughout their long life these reducers maintain their initial high efficiency.

10 ADVANTAGES

- Extreme Simplicity
- Compactness
- Efficiency
- Long Life
- Smooth Transmission
- Extra Strength
- Low Maintenance
- Oil-tight Housing
- Quiet Operation
- Wide Range of Ratios

THE HORSBURGH & SCOTT CO.
GEARS AND SPEED REDUCERS
5112 HAMILTON AVE. • CLEVELAND 14, OHIO, U.S.A.

Send note on Company Letterhead for Speed Reducer Catalog 46

50 years in BROACHING!

. . . we're the oldest in the world

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GOLDEN ANNIVERSARY

PLEASE TURN.....

GOLDEN ANNIVERSARY

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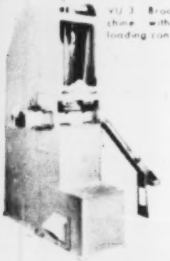
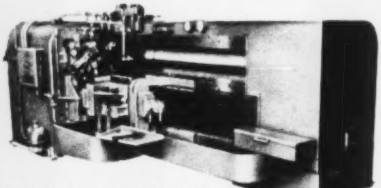


VU-3 Broaching Machine with automatic loading conveyor

HP-40 Broaching Machine with fixture for broaching Stator Segments, Gas Turbine Generator

DRV Double Ram Vertical Broaching Machine 25 Ton, 66 inch stroke



DRH Double Ram Horizontal Broaching Machine 15 Ton, 66 inch stroke

Write for the booklet, **"Life was like that . . . before Broaching!"** The old-time pictures of automobiles, agricultural machinery, aircraft, etc., indicate the progress made since 1902. **Ask for Booklet C.**

Proud? . . . of course we're proud! Being the pioneer manufacturer, we feel that in those 50 years we have been responsible in no small measure for the development of the art of broaching — a process that is relatively new in the field of metal-working, but one that accomplishes truly remarkable savings of time, labor, and *cost* in all types and all sizes of shops.

With such a head start, it's hardly any wonder that we are also the world's *largest* manufacturers of broaching machines and broaches. Age alone couldn't bring us this size-distinction, but conscientious and capable service throughout the years *did!*

NO ONE ELSE HAS HAD 50 YEARS IN BROACHING . . . *so no one else, of course, has acquired 50 years of broach-engineering-background to place at your disposal.*

THE LAPOINTE MACHINE TOOL COMPANY
HUDSON, MASSACHUSETTS • U. S. A.
Branch Factory: Watford, Herts., England

THE WORLD'S OLDEST AND LARGEST MANUFACTURERS OF BROACHING MACHINES AND BROACHES

each combination of change gears. By thus providing for overlapping of cutting operations and automatically selected speeds and feeds best suited to both high speed and carbide tools, output per machine as high as 10 to 1 over former methods is achieved.

"These examples sustain my contention that only through simultaneous use of more tools on the same machine and substitution of automatic performance for manual, can sufficient manpower be transferred to support enormous defense production schedules now, or prices held within the bounds of consumer pocket-books in a normal peacetime economy."

Mr. Conrad:

"THE tool engineer again becomes the key man in our economy. The job he faces is not an easy one. For his endeavor to be successful, he must increase productivity of both civilian and defense programs over any figures ever before achieved. Upon him lies the burden for upping our production.

"Again this job is one of surveying carefully all production operations to make certain that machines and tools are producing to their maximum ability. What new machines he orders, though they are admittedly hard to get, must produce more pieces per man hour than any previous designs. Military designers are throwing the closest tolerances ever specified on the toughest materials ever ma-

HARRY E. CONRAD

executive sec., American Society of Tool Engineers Inc., Detroit

RUDOLPH IS RIGHT!

"LOOK HOW RUDOLPH'S OUTPUT HAS INCREASED SINCE THEY CHANGED TO THE RIGHT CUTTING FLUID!"

THE BEST MACHINE and the finest operator cannot do the best work without that irreplaceable essential — the *right* cutting fluid. Seldom is there more than one cutting fluid that is exactly *right* for the job — with which it may be done faster and better, or both.

Stuart combines theory and practice to give you the right cutting fluid for the job. Here is an example:

In a large gear department, cutting fluid tests were run on Gleason Revacycles cutting 8620 gear stock, 179 Brinnel hardness.

	"X" Oil	Stuart's SPEEDKUT "A"
Gears Per Tool Grind	1200	3200
Stock Removal to Recondition Cutters	.009"	.0035"
Price of Cutting Oil	33c/gal.	35c/gal.

There's a story! More production because of less downtime. Longer cutter life because of fewer grinds and less stock removal per grind. A lower *actual cost* for the cutting fluid.

You can get help like this from a Stuart Representative. Ask to have him call.

Are you receiving Stuart's Shop Notebook regularly?
Write, wire or phone

GET MORE PRODUCTION
Use The Right Cutting Fluid

STUART SERVICE
Goes with every Barrel
Offices in Principal Industrial Centers

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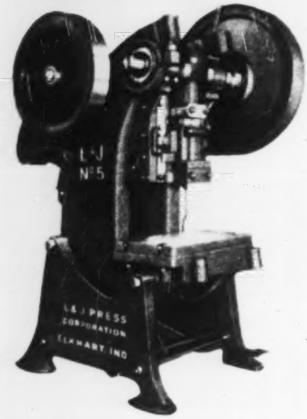
L&J PRESSES
Better-Built for Better Work



The rigidity, accuracy and dependable performance of L & J Presses will pay off for you in better work. You'll get close tolerances, long die life and high output. Year after year, they will give volume production runs with a minimum of attention on a wide variety of jobs. L & J Presses are designed right and built right to efficiently fill your stamping and drawing needs.

L & J Presses are made in 12 O.B.I. models back geared and plain flywheel types and 8 sizes 6 to 80 ton capacities.

WRITE FOR LITERATURE

SPECIFICATIONS
No. 5 Back Geared Press
(Illustrated)

50 ton capacity, 4" standard stroke, 45 strokes per minute, 10¼" or 15¼" die space (bed to slide, stroke down, adjustment up), 29¼" x 18¼" bolster plate area L. to R. x F. to B., 9½" throat depth, 12" opening through back, 6,700 lbs. net weight. Also made in plain flywheel type.

L&J PRESS CORPORATION
1628 STERLING AVENUE
ELKHART, INDIANA

chined. And many times the civilian production is called upon to use some of the least desirable materials from machinability and heat-treatment standpoints.

"While the job is not easy, tool engineers who did it twice in the last ten years can do nothing else but do it again—and it will be done with startling proficiency."

Mr. Seifreat:

"THE machine tool industry is to be complimented on its production record despite severe difficulties encountered.

"First tangible relief to the material problem came in July, 1951. This relief is gradually resulting in increased production.

"A price control pattern conducive to increased production and subcontracting did not develop until the end of July 1951, and considerable time was required to place this pattern in effect. How long this pattern will be ample remains to be seen. Manpower has been and will continue to be a serious obstacle. Pool orders which provided effective financing during World War II, have only recently appeared in volume.

"Regulations covering the distribution of machine tools are "shotgun" applications. The realistic scheduling of World War II, would provide more effective distribution of tools and result in more rapid increase in armament production. The armed services could help their own programs by exercising less

E. J. SEIFREAT
president, Seifreat-Elstad Machinery Co., Dayton, O.

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is easy
...with
STAR
BLADES

Whatever your metal cutting problem, there's a STAR BLADE that's just the *right* blade to make your job easy, efficient and fast.

Your supplier has the complete STAR line of hacksaw blades, frames and metal-cutting band saws, the line most people buy.

Sold only through recognized distributors

CLEMSON BROS., Inc.
MIDDLETOWN, N.Y., U.S.A.
Makers of Hand and Power Hack Saw Blades, Frames, Metal Cutting Band Saw Blades and Clemson Lawn Machines
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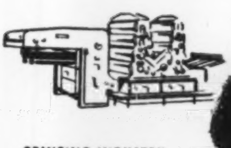
It's the EXPERIENCE that counts...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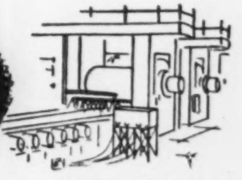
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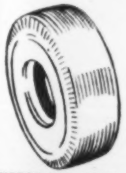
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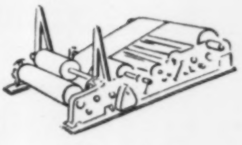
PLASTICS INDUSTRY

Reliance V★S is the result of nearly 50 years' experience in the engineering and application of Adjustable-speed Drives

V★S Drive provides an unlimited range of speeds from A-c. circuits. In addition, V★S offers controlled acceleration and deceleration; slow speed for jogging, inching or creeping; fast, smooth reversal at any point desired and other specialized functions to suit particular applications. Safe, simplified control saves man hours—reduces operator fatigue. Centralized operator's station for the control of one or more drive motors can be located at any convenient point. Write today for *new* V★S Drive Bulletin D-2311.

RELIANCE
V★S
DRIVE

FOOD INDUSTRY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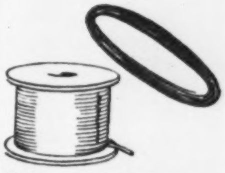
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MINING INDUSTRY

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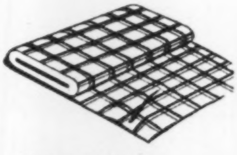
PROOF of PROGRESS!

Just after the turn of the century, the lathe above made news with its adjustable-speed Reliance Armature-shifting Motor. Modern lathes (right) have built-in Reliance V★S Drives to provide control of all functions of spindle and speeds.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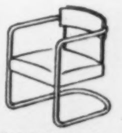
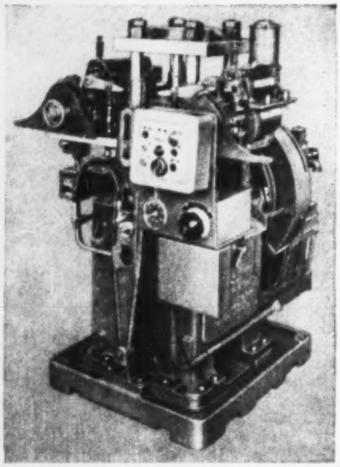

METAL FABRICATING INDUSTRY

RELIANCE ELECTRIC AND ENGINEERING CO.

1081 Ivanhoe Road, Cleveland 10, Ohio • Sales Representatives in Principal Cities



Dieing Machines are available in capacities ranging from 10 to 500 tons.

High Speed *plus* Long Die Life

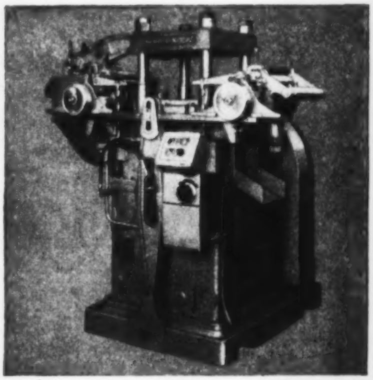
YOU GET BOTH WITH

HENRY & WRIGHT DIEING MACHINES

Speed alone on metal stamping won't beat rising costs these days. They're too tough. You need the one-two punch that only Henry & Wright Dieing Machines can deliver — the one-two punch that combines speed with long die life.

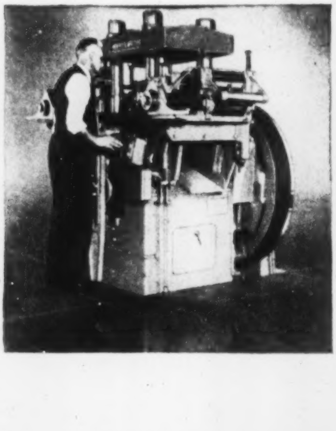
Henry & Wright Dieing Machines do the work of five to ten ordinary presses. Users report production rate increases as high as 600% and die longevity boosted as much as 1200%. ONLY THE BEST IS GOOD ENOUGH today. You get the best in Henry & Wright.

Other equipment available from Henry & Wright includes automatic power straighteners, unwinding reels, scrap cutters, special automatic feeds.



One H. & W. Dieing Machine will do the work of 5 to 10 ordinary presses.

Complete per stroke progressive dieing that's fast, accurate, and sustained.



Only the best is good enough

HENRY & WRIGHT
DIVISION OF EMHART MFG. CO.

FOR MORE INFORMATION ON OUR MACHINES, PLEASE WRITE
HENRY & WRIGHT, 440 WINDSOR ST., HARTFORD, CONN.

supervision of their contractors and if they had had fewer non-applicable purchasing regulations."

Mr. Bryant:

"LONG RANGE defense planning requires immediate formation of a policy for long range utilization of the machine tools which our government is now acquiring. It is foolish to charge the machine tool industry with being a 'bottleneck' in the defense program at the present time when a constructive policy of conservation at the end of the last war would have preserved much of the government's great stock of machine tools and saved hundreds of millions of taxpayers' dollars and would have permitted our present defense program to proceed at a much greater rate than it is doing currently.

Dr. Boston:

"CONSIDERABLE research has been done in machinability of the scale of gray iron castings. Castings in the form of hollow cylinders 6 inches outside diameter, 4 inches inside diameter and 18 inches long were cast on the side with large gates and risers to provide uniform solid metal.

"Machinability was evaluated by running tool life tests determined by flank wear on hi-speed steel tools when the scale of the casting was in the as-cast condition, in an annealed condition, in a

A. G. BRYANT

pres., Bryant Machinery & Engineering Co., Chicago

GOOD NEWS for the grinding department

GRINDING DEPT. BULLETIN
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SIMONDS
ABRASIVE CO.

Grinding Wheels

Production up! That's the bulletin board's big news... good news that started when Simonds Abrasive Company wheels went to work in the grinding department. Simonds complete line includes wheels accurately specified for top results on *your* jobs . . . grinding wheels, mounted wheels and points, segments and abrasive grain . . . all made under complete quality control by Simonds Abrasive Company, a major manufacturer of grinding wheels for almost 60 years. Write for free data book and your distributor's name.

SIMONDS ABRASIVE CO. PHILADELPHIA 37, PA. BRANCH WAREHOUSES: CHICAGO, DETROIT, BOSTON
DISTRIBUTORS IN PRINCIPAL CITIES

Division of Simonds Saw and Steel Co., Fitchburg, Mass. Other Simonds Companies: Simonds Steel Mills, Lockport, N. Y., Simonds Canada Saw Co., Ltd., Montreal, Que. and Simonds Canada Abrasive Co., Ltd., Arvida, Que.

MORSE
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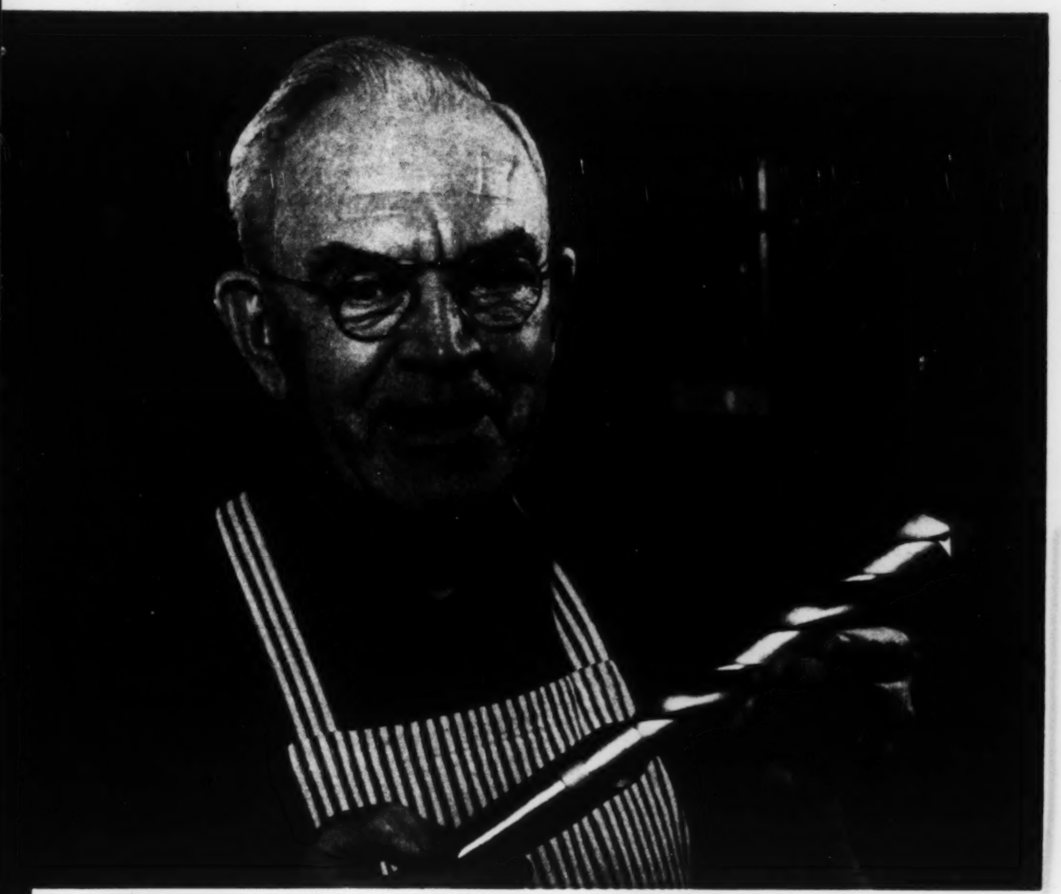
"That's right
for 50 years, man
and boy, we've
used everything
MORSE makes!"



Yes, that's *right!* Ask the tool-crib men in the top precision plants . . . . and count the times you get this same answer:-

"Sure, Morse makes everything we need in the way of cutting tools, and makes the best that *can* be made. That goes for drills, taps, dies, reamers, end mills, counterbores, countersinks, and milling cutters. So whatever we run into, we know we've got the cutting tools that will give us the same top performance on every job."

And *that's* for sure . . . if you want Morse Quality, then you've got to be sure to get genuine Morse Tools. Ask your Morse-Franchised Distributor . . . he's got the know-how *and the Morse stock* to give you the Morse Tools you need for any cutting job.

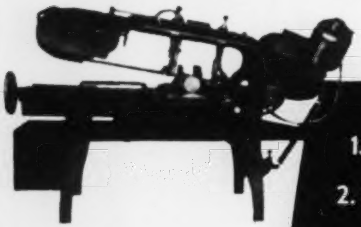
Morse Twist Drill & Machine Company
NEW BEDFORD, MASS.
(Div. of VAN NORMAN CO.)
Warehouses in New York, Chicago, Detroit, Houston, San Francisco

MORSE

Cutting Tools

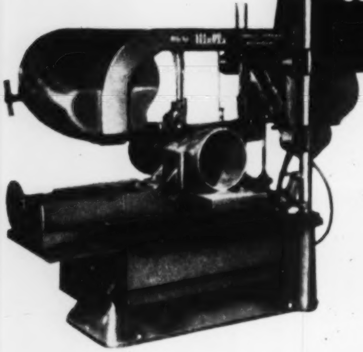
5 BIG REASONS

Why Wells Band Saws slash metal cut-off costs



Above is the Wells No. 8, shown with wet cutting system. It offers a capacity of 8" x 18", rectangular, 8" dia., rounds. The No. 5 is similar but has a capacity of 5" x 10" rectangular, 5" dia., rounds.

1. Fast, Accurate Action
2. High Job Productivity
3. Low Operating Cost
4. Real Blade Efficiency
5. Long, Dependable Service



Left is the Wells No. 12 which features an automatic cutting cycle and controlled blade pressure. It has a capacity of 12" x 16", rectangular, 12¾" dia., rounds. Die block capacity 12¾" deep, 16" wide, 18" clearance bed to blade.

YOU are always ahead when you handle your cut-off jobs on "Wellsaws." The Wells Band Sawing method will not only reduce your operating costs, but also give you greater job efficiency — better cuts, and real dependable service. There is a size and type for every need and every budget. Capacities range from 3½" x 6" to 48" x 48". All models are built for full duty and backed by over 25 years of band saw manufacturing experience.

Your Wells Distributor will be pleased to give you full information on models suited to your needs — or write for descriptive literature.

Wells

The Pioneers of Horizontal
METAL CUTTING
BAND SAWS

WELLS MANUFACTURING CORPORATION
1515 FILLMORE ST. THREE RIVERS, MICHIGAN

tumbled as well as shot blasted condition, pickled electrolytically, and soaked in hydrofluoric acid for 45 minutes. Another series of cylinders was first machined and then annealed. It was found that the as-cast gave the greatest tool wear, but using this condition as 100 per cent, machinability as expressed as V_{30} which is the cutting speed for a 30-minute tool life based on complete tool failure was, in percentages, as follows: as-cast 100%; tumbled and shot blast, each 110%; electrolytic pickle and hydrofluoric acid treated 160%; annealed scale 200%; annealed machined surface 250%.

O. W. BOSTON, professor of production engineering, University of Michigan.

Mr Gotberg:

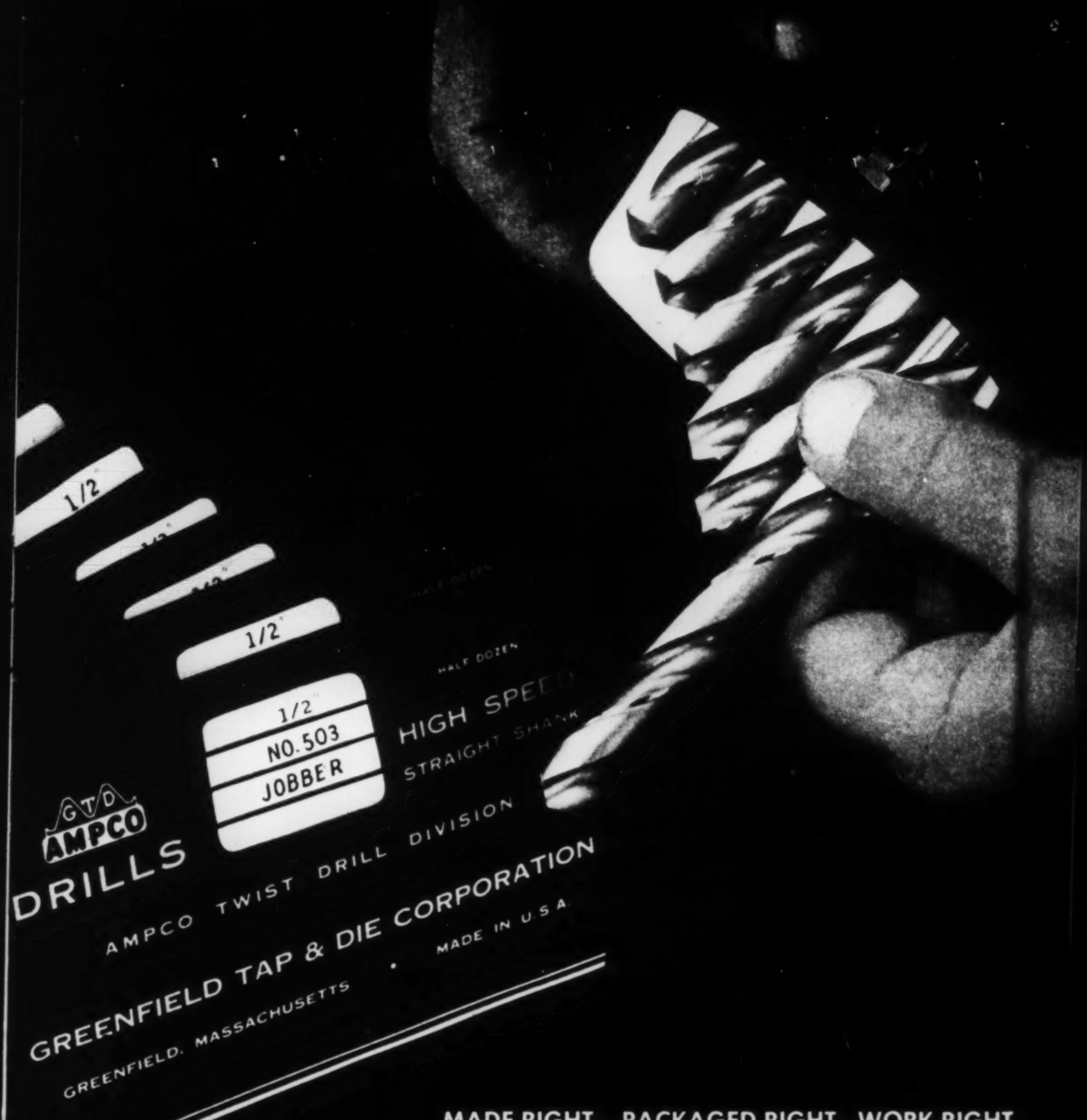
"WHEN productivity is the watchword, broaching should constantly be under consideration as one of the fastest methods for metal removal and most accurate for producing parts to close tolerances.

"A problem has been that cutting time for broaching is so much less than either loading or broach handling time. Thus, it has been necessary to place much design emphasis on developing automatic and semi-automatic loading devices as well as specialized broach handling equipment.

"One method currently used with success is strip broaching whereby the broach is pushed through a part and then returned before the part is unloaded."

HARRY H. GOTBERG

vice president, Colonial Broach Co., Detroit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GREENFIELD, MASSACHUSETTS • MADE IN U.S.A.

MADE RIGHT— PACKAGED RIGHT—WORK RIGHT.

Whether your job calls for a tiny No. 80 wire drill or a mammoth hammer-forged special, or anything between, you'll find a GTD AMPCO Drill for every requirement. Worthy companions to the famed GTD GREENFIELD lines of Taps, Dies, and Gages.

Mr. Mattison:

"DEFENSE production has further emphasized the importance of high production precision surface grinding as a vital manufacturing process. Especially in the machine tool field the trend toward greater use of hardened surfaces for wear resistance, made possible by new techniques in flame and induction hardening and new alloys have necessitated the use of larger surface grinders of greater accuracy and ruggedness.

"These larger machines are able to maintain precision with around the clock use and even with semiskilled labor. New developments in stress relieving and normalizing together with other manufacturing and design procedures tend to give these larger machines the increased stability necessary under today's heavy production requirements."

ALAN C. MATTISON, president, Mattison Machine Works, Rockford, Ill.

Mr. Rosborough:

"OUR design engineers have devoted much time and thought to improvements in cylinder boring for automotive engine blocks and similar production boring operations.

"Since the first multiple spindle, vertical, production-type cylinder boring machine was built, there has been a continual improvement of the machines and cutting tools as well as related work-handling methods. Non-piloted boring of engine cylinders is commonplace today, but in the earlier years of automobile manufacture, piloted boring bars were considered necessary.

"We have been giving particular attention to automatic handling of the work pieces by means of transfer type machines for automotive cylinder operations. The result, of course, is a reduction in direct labor cost per unit produced."

CALDWELL R. ROSBOROUGH, president & gen'l mgr., Moline Tool Co., Moline, Ill.

"A LONG, LONG LIFE and ALL-OUT SERVICE"

McDANEL HIGH TEMPERATURE COMBUSTION TUBES

For Carbon and Sulphur Determinations

Made of a highly refractory porcelain body exclusively developed to provide maximum resistance to thermal shock, McDanel Combustion Tubes cut control costs to rock bottom by their long wear. Their *service record* in metallurgical laboratories from coast to coast has made them favorites since 1919.

Write Today for
Catalog "McDanel Industrial Porcelains"

Specialties

Refractory Porcelain Specialties to meet specific needs can be "custom-made" by McDanel to do the job. Standard flasks, retorts, crucibles, etc., available immediately on order.

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Serving INDUSTRY *since* 1887

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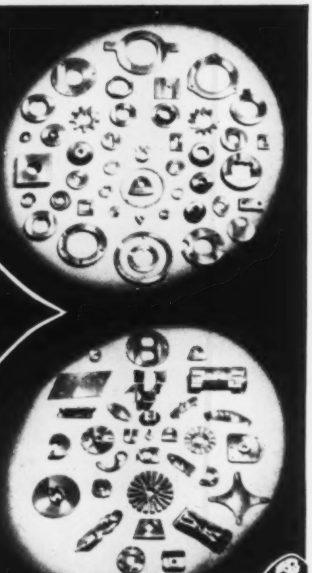

Standard and Special Washers, of every description, from every kind of material, any desired finish . . . designed for every purpose . . . utilizing more than 22,000 Sets of Dies.

Let us Quote on Your Needs.

WROUGHT WASHER MFG. CO.
THE WORLD'S LARGEST PRODUCER OF WASHERS
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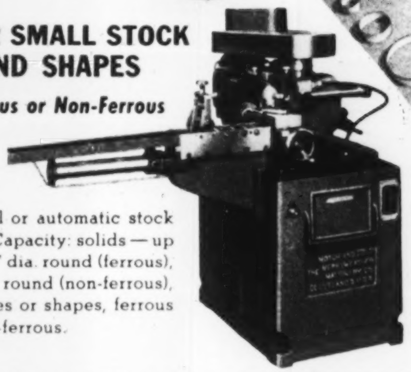
It's the Cost per Cut that Counts..

REDUCE YOURS BY USING THE Triple-Chip METHOD

Motch & Merryweather offers circular sawing machines to cut off any size or shape of metal from titanium to magnesium, including high-speed machines for all non-ferrous metals. Triple-Chip saw blades with "Hi-Lo" features deliver square, burrless ends accurate to length. M. & M. automatic blade grinders impart the correct cam-generated tooth form for maximum results. May we present a convincing time study for your operation?

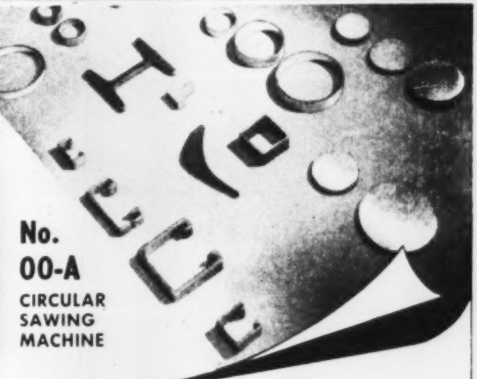
— FOR SMALL STOCK AND SHAPES

Ferrous or Non-Ferrous

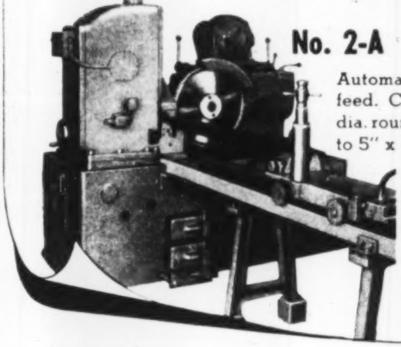


Manual or automatic stock feed. Capacity: solids — up to 1¼" dia. round (ferrous), 3" dia. round (non-ferrous), 3" tubes or shapes, ferrous or non-ferrous.

No. 00-A CIRCULAR SAWING MACHINE

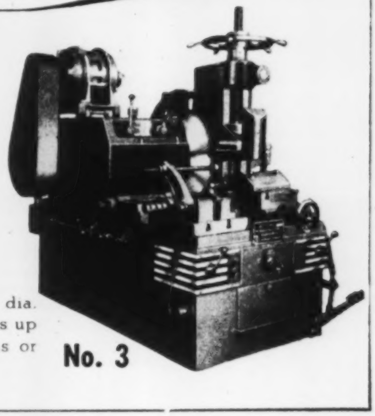


— FOR LARGER STOCK . . .



No. 2-A

Automatic or manual stock feed. Capacity: up to 6½" dia. round; structural shapes to 5" x 12" I-beam. Ferrous or non-ferrous.



Capacity: up to 9⅝" dia. round; structural shapes up to 18" I-beam. Ferrous or non-ferrous.

No. 3

. . . also 2 still larger sizes —

No. 4 Capacity: up to 16½" dia. round; structural shapes up to 24" I-beam. Ferrous or non-ferrous.

No. 5 Capacity: up to 30" dia. round. Ferrous or non-ferrous.

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Manufactured by

THE MOTCH & MERRYWEATHER MACHINERY COMPANY
715 PENTON BUILDING • CLEVELAND 13, OHIO
Builders of Circular Sawing Equipment, Production Milling, Automatic and Special Machines

Only M & M builds ALL 3:
CIRCULAR SAW
SAW BLADE
BLADE GRINDER

PRODUCTION-WITH-ACCURACY MACHINES AND EQUIPMENT

Brinell Testing

at PRODUCTION LINE SPEEDS

Simply set tolerance hands on the lower dial of this Brinell Hardness Tester to the desired limits and the operator merely notes that the indicator points stop within them.

No grinding or preparation of parts is necessary. Foot operation permits free use of both hands. Tests are completed as rapidly as the operator can handle the parts.

Standard Brinell test loads are used . . . machine is motor-driven . . . loads are applied hydraulically . . . round and flat parts are handled equally well.

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FILLING A GOVERNMENT ORDER. Finished spinning — being trimmed — uses teamwork to achieve close tolerance for special project. An example of the all-gage — all-metal — any quantity — spinning capacity available at Teiner. ***Write for newest color brochure 51-S.***

ROLAND TEINER CO. INC. · EVERETT · MASSACHUSETTS

ROLAND TEINER
CO. INC. 134 TREMONT ST., EVERETT 49, MASS.

Mr. Beardsley:

"MACHINE tools may, on the surface, be the bottleneck in our present production program. It may be that machine tool application could also be contributing to our predicament. Some manufacturers are still finishing parts by old slow methods obsoleted before World War II. Internal grinders now are capable of finishing holes to tolerances in millionths and to surface finishes of less than one micro-inch.

"In the first place, one or two operations are eliminated in production and second, because of this interchangeability, time is saved both at initial assembly and in the replacement of parts in the field."

J. H. BEARDSLEY, general manager, Bryant Chucking Grinder Co., Springfield, Vt.

Mr. Trecker:

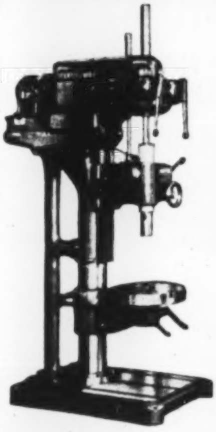
"EARLY in 1951 Kearney & Trecker completed a two-year, million dollar development program which effected a redesign of our standard line of milling machines. Coincident with this activity were concerted efforts in the development of numerous special milling machines, for the improvement of methods and techniques in machining principal components of automotive products.

"Events since Korea changed this picture radically. Further improvement of standard machine

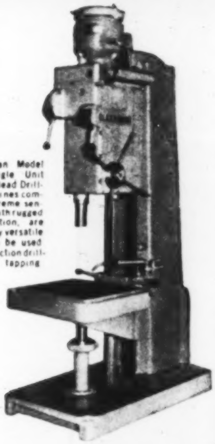
FRANCIS J. TRECKER

president, Kearney & Trecker Corp., Milwaukee

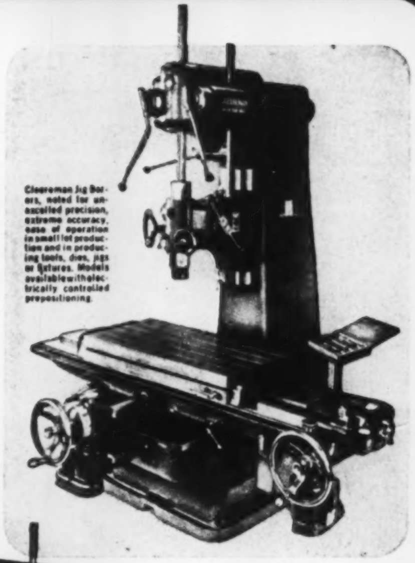
THE CLEEREMAN LINE



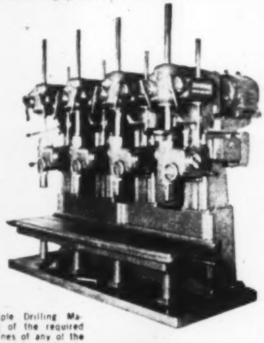
Cleereman Round Column Drilling Machines produce accurate holes at high speed and at low cost and are general purpose machines with high production



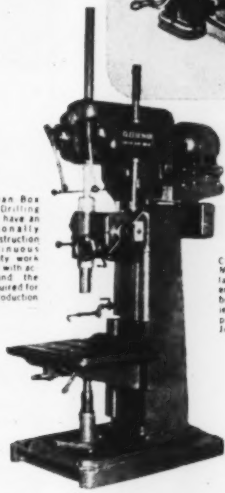
Cleereman Model 325 Single Unit Sliding Head Drilling Machines combine extreme sensitivity with rugged construction, are extremely versatile and may be used for production drilling and tapping



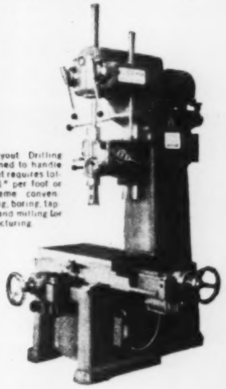
Cleereman Jig Borers, noted for unexcelled precision, extreme accuracy, ease of operation in small lot production and in producing tools, dies, jigs or fixtures. Models available with electrically controlled prepositioning.



Cleereman Multiple Drilling Machines consisting of the required number of machines of any of the three types supplied to meet individual requirements



Cleereman Box Column Drilling Machines have an exceptionally rigid construction for continuous heavy duty work combined with accuracy and the speed required for low cost production



Cleereman Layout Drilling Machine designed to handle layout work that requires tolerances of .001" per foot or broader. Extreme convenience for drilling, boring, tapping, reaming and milling for Jigless manufacturing

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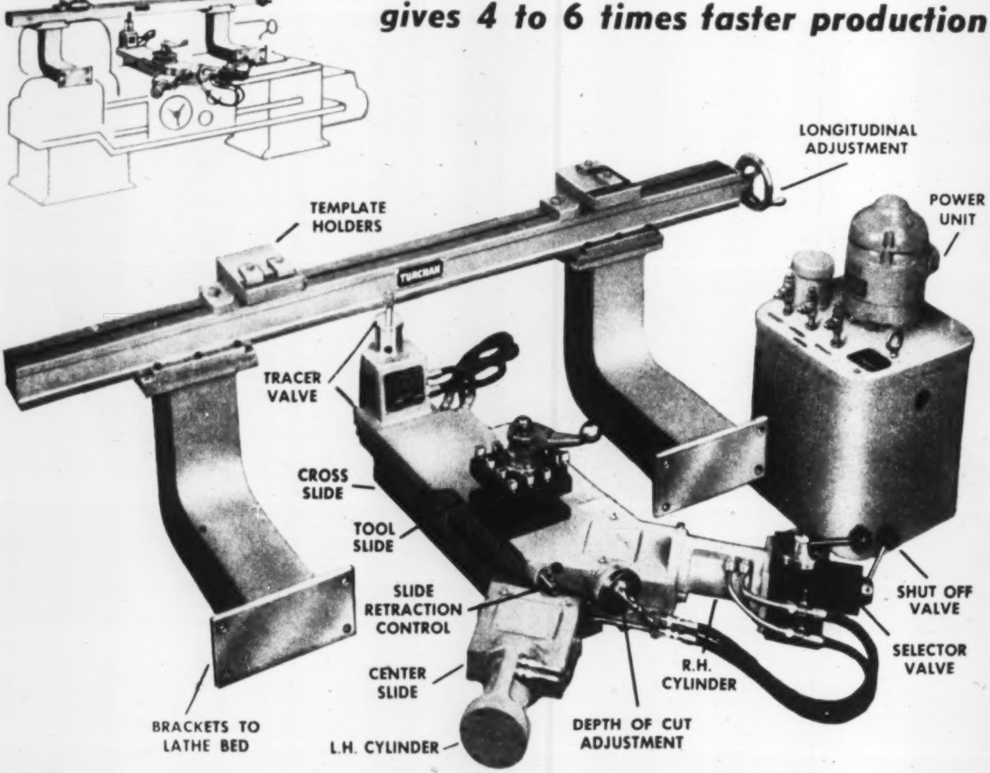
CLEEREMAN MACHINE TOOL CO. Green Bay, Wisconsin

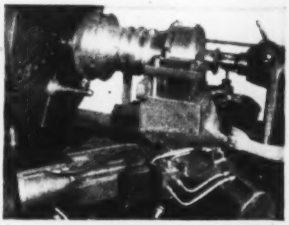
Greatest advance in turning since the invention of the metal working lathe!

Turchan hydraulic dual duplicator gives 4 to 6 times faster production


LONGITUDINAL ADJUSTMENT
TEMPLATE HOLDERS
POWER UNIT
TURCHAN
TRACER VALVE
CROSS SLIDE
TOOL SLIDE
SLIDE RETRACTION CONTROL
SHUT OFF VALVE
SELECTOR VALVE
R.H. CYLINDER
CENTER SLIDE
BRACKETS TO LATHE BED
L.H. CYLINDER
DEPTH OF CUT ADJUSTMENT

Just add this Turchan dual-turning hydraulic duplicator to your standard lathes and watch costs go down! No more need for costly special form tools. No skilled help required. Job set-up time is cut to a small fraction of old way. A cross slide equipped with two compounds at 45° to center line and 90° to each other replaces the conventional arrangement, allowing a new combination of movements. The 45° compound movements are controlled through a tracer, guided by template or full size model, while the cross and longitudinal travels are obtained with the regular lead screws.

This doubles tool approach to the work, greatly extending use of the machine tool. Only one slide at a time is controlled by the tracer. Machining of right or left square shoulders, bevels, tapers, steps, undercuts, radii and contour facing is easily accomplished. All this at faster speeds, and greater accuracies (to .001"). Size of work is limited only to capacity of the lathe. There are other Turchan Follower attachments for milling machines, planers, shapers and grinders. "Turn to Turchan to cut costs." Send for our latest descriptive folder.



This large form mould on a 60-inch lathe was turned 4 times faster by Turchan dual control than by former method. A tough job made simple!

WRITE US TODAY: Send a sketch and specifications of any job. Give make of machine. We'll show you how to produce it better, faster, at lower cost.

Turchan FOLLOWER MACHINE CO. 8259 LIVERNOIS AVENUE
DETROIT 4, MICH.

OLDEST MANUFACTURER OF HYDRAULIC ATTACHMENTS FOR MACHINE TOOLS design is temporarily frozen to accommodate the much greater requirements of volume production. Machine tool development now is centered on defense production."

Mr. Raterman:

"ONE way in which many plants are securing greater productivity—and doing it on a fast and easy basis—is by the increasing application of tracer-controlled machines to turning operations wherever practicable. The air-gage tracing principle is not new, but its steadily widening application to tough production turning operations remains new.

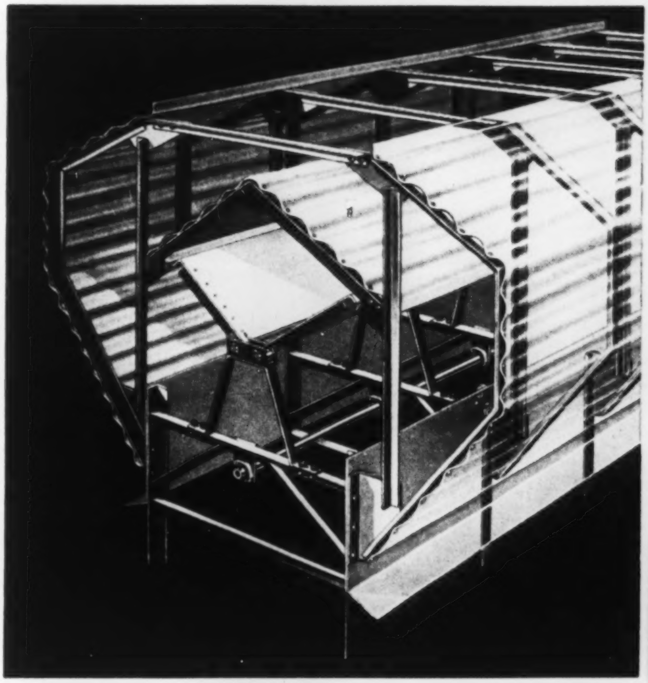
"Of the outstanding machine tool achievements in 1951, development of the right-angle chucking and facing lathe of a new design for the rapid, accurate machining of jet aircraft engine rings and discs promises to hold major significance for the long term. This new equipment makes possible tremendous time savings and cost reductions in jet engine production and other classes of work."

Mr. Gleason:

"MACHINE tools have played a vital role in the underlying technology by increasing production, lowering costs, bettering the structure, and raising the quality of the myriad units turned out on every side. The invention and construction by The Gleason Works of im-

JEROME A. RATERMAN

pres., Monarch Machine Tool Co., Sidney, O.



TURN ON THE AIR . . .
EXHAUST HEAT, SMOKE AND FUMES
WITH THE HIGHLY EFFICIENT
BURT MONOVENT

It's almost that simple, because the Burt Monovent Continuous Ridge Ventilator functions like a gigantic exhaust valve.

Installed as a continuous unit the entire length of the building, Burt Monovent opens the entire roof line to exhaust bad air rapidly from the whole structure. Center hinged type dampers—controlled from floor level—open, adjust and close the unit. Heavy industry—steel mills, foundries, forge shops, etc.—find the Monovent particularly useful.

The Monovent's simplicity and heavy construction assure long, trouble-free life with almost no maintenance. See Sweet's for complete data or write for Bulletin S.P.V. 6.

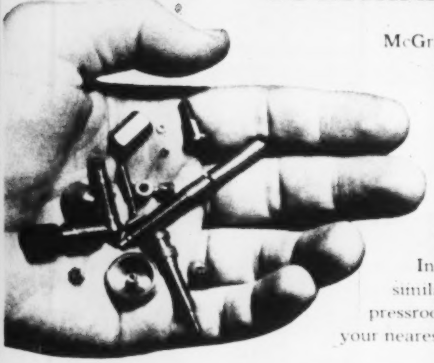
FAN & GRAVITY VENTILATORS • LOUVERS • SHEET METAL SPECIALTIES

The Burt Manufacturing Company

905 So. High St. Akron 11, Ohio

THIO
TRADE MARK
Cutting Oil

Toastmaster has the situation in hand



McGraw Electric Company's Toastmaster Products Division at Elgin, Illinois, settled the cutting oil question ten years ago with THIO Cutting Oil. This coolant is now widely used in the production of ferrous and non-ferrous parts in Toastmaster's automatic screw machine departments.

Satisfactory tool life has been one advantage of using THIO Cutting Oil. The quality of the finish has been of particular importance, however, since special finishing operations have been eliminated. All parts, from a .020 inch washer to a 25½ inch bar, are ready for assembly as they come from the automatics.

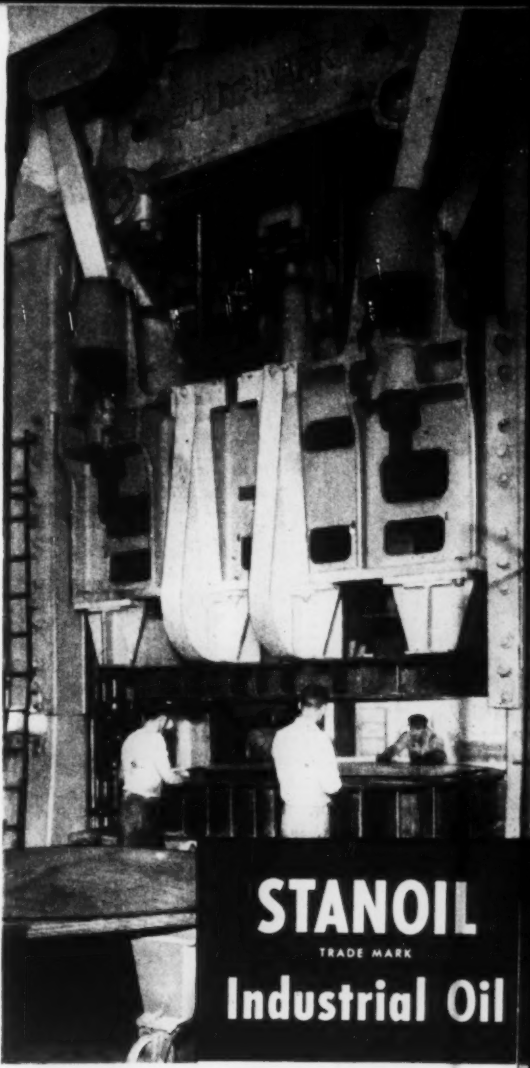
In short, Toastmaster has the coolant situation well in hand. To develop a similar case in your own screw machine or grinding departments, or in your pressroom, call for the services of a Standard Oil lubrication specialist. Contact your nearest Standard Oil Company (Indiana) office.

What's YOUR problem?

William Voegeli, of Standard Oil's Joliet office, has worked closely with McGraw Electric Company for several years—helping to maintain the high standard of quality that THIO Cutting Oil is making possible on automatic screw machine work.

Like all Standard Oil lubrication specialists, he has a broad background of practical experience plus thorough training in Standard's own schools. And like all lubrication specialists, his on-the-job assistance is always available to the industries in the immediate area he serves. He is one of a corps of experienced men who make their headquarters wherever industry is located throughout the Midwest.

For help with *your* problem, call for the services of your Standard Oil lubrication specialist today!



STANOIL

TRADE MARK

Industrial Oil

If your problem concerns hydraulics, consider the case of this heavy-duty toggle press. Here, the use of STANOIL Industrial Oil has resulted in over three years of trouble-free service to date, with no need to shut down for inspection of the hydraulic system. Samples show the hydraulic oil to be in excellent condition.

In a wide range of metalworking equipment—in speed reducers, air compressors, machine-tools, electric motors, oil bath and bearing systems, as well as in hydraulic systems—STANOIL offers greater oxidation stability, greater protection against rust, and satisfactory performance at all temperatures. Ask your Standard Oil lubrication specialist about STANOIL Industrial Oil today. Contact your nearest Standard Oil office, or write: Standard Oil Company (Indiana), 910 South Michigan Avenue, Chicago 80, Illinois.

STANDARD

STANDARD OIL COMPANY

(INDIANA)

"New Process"
Punches • Dies • Rivet Sets
Compression Riveter Dies

Made to highest standards and uniform quality thus insuring maximum service—
Since 1903

Large inventory of stock sizes of round punches and dies also rivet sets available for immediate shipment. Square, rectangular, oblong and elliptical shapes made to order.

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Telephone FIdelity 2-5500

proved designs of bevel gear machinery have continued to be identified with the positive transmission of power."

E. BLAKENEY GLEASON, president & general manager, Gleason Works, Rochester, N. Y.

Mr. Dolle:

"THE T-lathe is one of the significant developments in metal turning. It is an entirely new approach in turning, facing and boring thin wall sections of large diameter and short length. Contrasted to raised or gap lathes and vertical boring mills formerly used on this class of work, the T-lathe has speed, sensitivity, accuracy and accessibility to the work piece which greatly simplifies precision turning of parts ranging up to 60 inches in diameter.

"Bed is in the shape of a 'T', with the carriage-carrying section at right angles to the centerline of the lathe. Movement of the carriage along the bed performs the facing operations. The top slide, with power feed, can be set at any angle to perform what is normally the turning operations."

WILLIAM L. DOLLE, president & gen. mgr., Lodge & Shipley Machine Tool Co., Cincinnati.

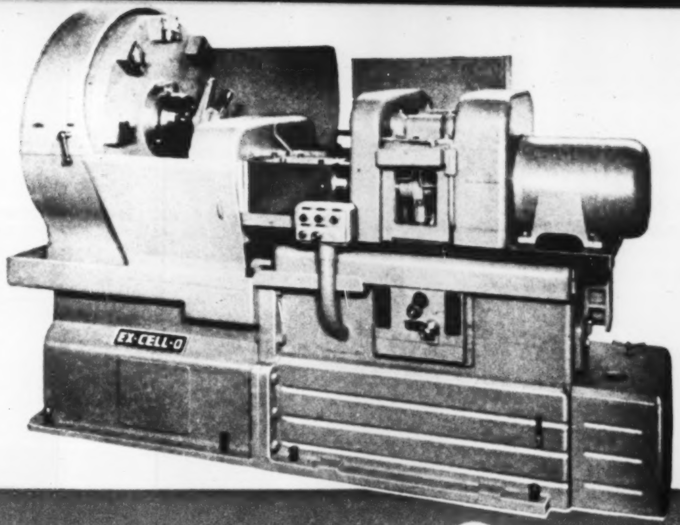
Mr. Woody:

"MANY advanced changes to simplify designs, to increase product efficiencies and to reduce maintenance and labor costs to their minimums were instituted in 1951 by Allis-Chalmers processing department.

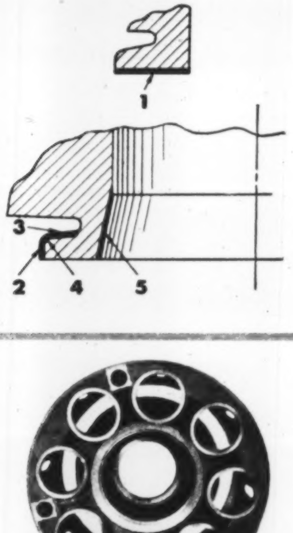
Hydrocone crushers, with the highly developed hydraulic principle for the crushing of stone and ores, are now available in head opening sizes 22 to 84 inches. This Hydroset principle enables the rapid changing from one product size to another. It facilitates making adjustments for wear on the crushing surfaces and, on the Hydrocone crushers, affords reasonable protection against tramp iron."

G. V. WOODY, manager, basic industries dept., Allis-Chalmers Mfg. Co., Milwaukee.

Ex-Cell-O One-Way Precision Boring Machine.



5 OPERATIONS ON 8 HOLES IN LARGE JET PART



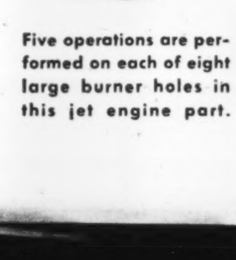
A TYPICAL EX-CELL-O SOLUTION TO A DIFFICULT PRODUCTION PROBLEM

THE JOB: a large jet engine part requiring complex precision machining.

THE MACHINE: Ex-Cell-O One-Way Precision Boring Machine equipped with two heavy duty spindles and a manually indexed fixture.

THE RESULT: five precision operations on eight large holes (a total of 40 operations). Net production—about three pieces per hour.

Operations performed are shown at left in heavy lines. The front spindle carries a facing head which feeds radially to face the front of the flange (1). The boring head of the rear spindle carries four tools, three of which are on slides. These successively (2) turn the O.D. of the flange, (3) back-face the flange, (5) taper-bore the I.D., and (4) plunge the radius at completion of the back-facing cut. For further information contact your local Ex-Cell-O representative or write direct.



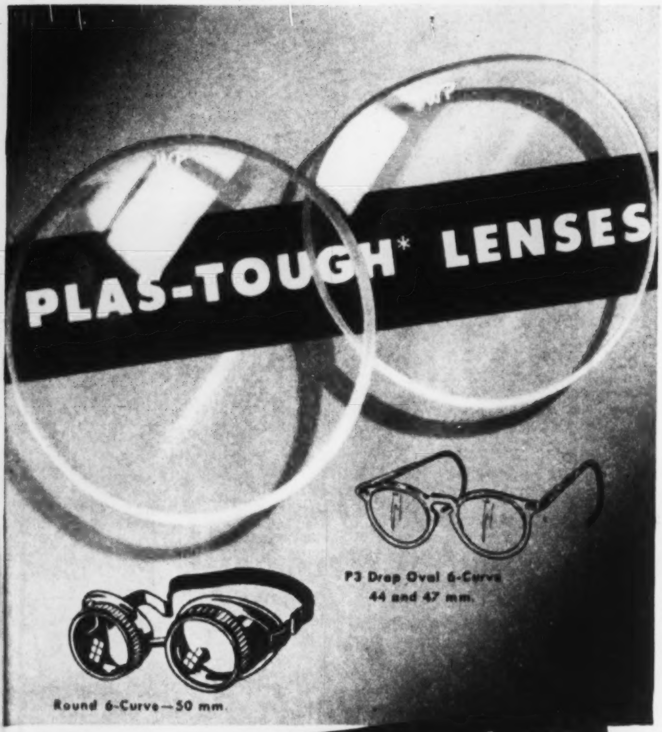
Five operations are performed on each of eight large burner holes in this jet engine part.

EX-CELL-O CORPORATION DETROIT 32, MICHIGAN

MANUFACTURERS OF PRECISION MACHINE TOOLS • CUTTING TOOLS • RAILROAD PINS AND BUSHINGS • DRILL JIG BUSHINGS • AIRCRAFT AND MISCELLANEOUS PRODUCTION PARTS • DAIRY EQUIPMENT

51-43

New WILLSON®



Only Half the Weight of Glass Lenses

- Newly developed, extra tough plastic
- Meets existing Federal Specifications for impact resistance and light transmission
- Improved surface hardness gives unusual resistance to pitting, scratches, abrasion and common industrial acids that mar ordinary plastics
- Light weight gives greater wearing comfort

*Trade Mark

See your WILLSON distributor or write us direct

WILLSON PRODUCTS, Inc., 233 Washington St., Reading, Pennsylvania

Dependable Products Since 1870

Mr. Grimm:

"JET ENGINE program made necessary the creation of specialized equipment for the economical manufacturing of the holding ends of the turbine blades or buckets. Difficulty encountered in machining the special, high temperature alloy metal used in these blades and the accuracy required on the complicated profile make it one of the most interesting operations in the metal machining field.

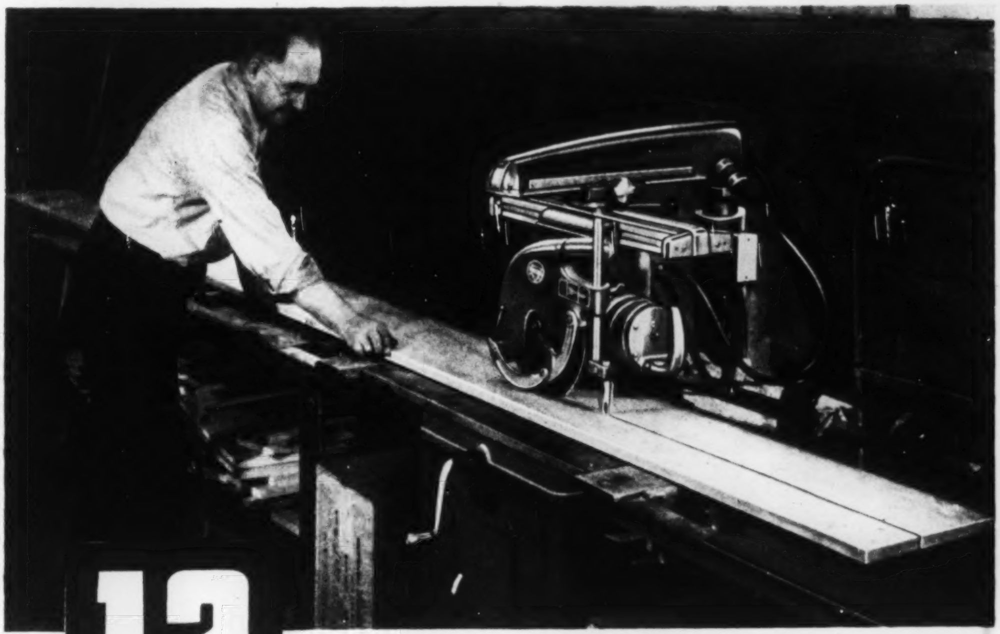
"Eventually a series of machines were designed to process and inspect the blades. The foil end of the blade offers problems in holding for the grinding of the fir tree end. An optical projection method was developed to orient the foil section and, after proper alignment, the foil end is cast in a matrix of low temperature melting cerobend metal.

"To do this a special Jones & Lamson duo lens comparator is used in conjunction with an electrically heated furnace equipped with suitable metering valve to permit a flow of the proper amount of the cerobend metal to envelop the blade, the entire casting being shaped by a master molding box.

"Blade is then placed in a J. & L. dual wheel blade grinder, utilizing locating surfaces provided in the master mold and secured by hydraulic clamping. Our company conceived the idea of passing the blade between two grinding wheels thus obtaining a completed fir tree holding end in one operation."

WALTER J. GRIMM

sec. & ass't. to gen. mgr., Jones & Lamson Machine Co., Springfield, Vt.



12 ways the DELTA RADIAL SAW can make money in your shipping room

Production profits are frequently lost *in the shipping room* because of outmoded equipment and old fashioned materials-handling techniques.

To protect your plant profits in today's markets you must gain all-around plant efficiency. This remarkable new Delta Radial Saw can be the major step in eliminating the shipping room bottleneck. Here are twelve ways it accomplishes that purpose:

1. **Reduces Equipment Investment**—one machine that does the work and saves the **cost** of many.
2. **Saves Floor Space**—saw is installed against a wall, so that material **moves freely through the shop.**
3. **Offers Exceptional Flexibility**—an all-purpose machine, you can keep it **busy all the time.**
4. **Reduces Set-up Time**—in a few seconds, change from cut-off to miter, to rip, etc.
5. **Saves Power Through Direct Drive Motor**—no gears, no belts, no pulleys to worry about.
6. **Increases Operator Safety**—extra safety guards; operators appreciate them.
7. **Reduces Handling Costs** — lumber always lies flat, moves on straight line to the saw.
8. **Reduces Lumber Waste** — minimum spoilage; work lay-out marks are always in plain view.
9. **Offers Increased Mobility**—a mobile power shop, easily shifted to any point in the shop for other emergency work.
10. **Simplifies Operating**—cross-cut action is "down and back" —even women operators use the saw safely, confidently.
11. **Cuts Much Faster**—Saw moves in straight line at any angle, slashes stock in seconds.
12. **Reduces Maintenance**—Delta advanced design keeps machine up to date, minimizes wear.

DELTA Another **ROCKWELL** **TOOLS** Product

Delta Radial Arm Saws are made in four sizes: from ½ HP to 7½ HP, with 8" to 20" saw blades. See for yourself how this machine can cut your shipping room costs. Ask your Delta Dealer, or write direct, for a copy of the Delta Radial Saw "Idea Book" It's packed with money saving suggestions.

There's a Delta Power Tool for Your Job-

WOOD OR METAL WORKING

53 MACHINES • 246 MODELS • MORE THAN 1300 ACCESSORIES

DELTA POWER TOOL DIVISION

DELTA MILWAUKEE **Rockwell**

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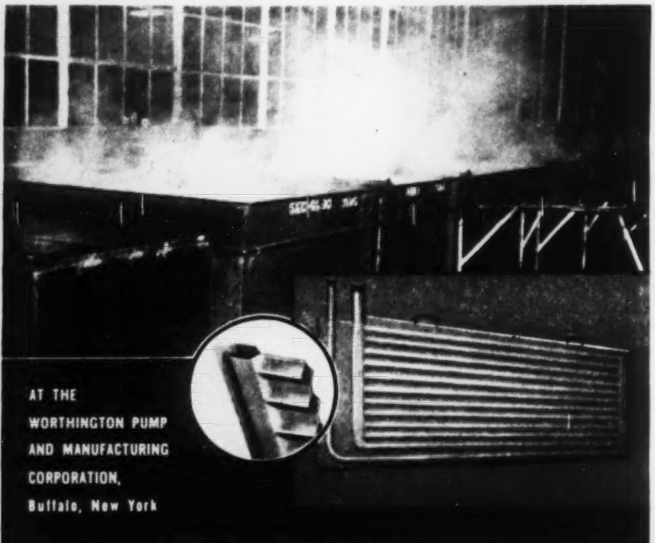


AT THE
WORTHINGTON PUMP
AND MANUFACTURING
CORPORATION,
Buffalo, New York

tank heating is faster, costs less

with PLATECOILS

(REPLACE PIPE COILS)

Worthington Pump and Manufacturing Corporation has found that it costs less to buy and use Platecoils in their Parkerizing tanks than it does to make their own steel pipe coils. When the steel pipe coils were used, they had to be replaced on the average of every 3 months. The Platecoils have been in use over a year, and there have been no repairs or expenses other than the original installation cost.

Platecoils heat the tanks faster because they have greater prime surface in any given area. A 22" x 47" Platecoil gives the same heat transfer surface as 32 ft. of 1½" pipe. This not only means quick starts in heating tank solutions but also greater tank capacity for work.

"quick change hangers" make installation easy

By the use of "quick change hangers," Platecoil installations can be made in open tanks in a half hour or less by one man and a helper. There is no welding or pipe cutting . . . two connections to make and the installation is complete. Should repairs become necessary, Platecoils can be removed and replaced in a matter of minutes without emptying the tank. Replacement is made from outside the tank.

Let us show you how you can conserve steel and save time, money and manpower by using Platecoils for tank heating or cooling. Write today for bulletin No. P72.

PLATECOIL gives you these ADVANTAGES

- Cleaned and Repaired Without Dumping Tank Solution
- Greater BTU Transfer Per Unit Area
- Weighs Only Half as Much as Pipe Coil
- No Threaded Joints in Tank
- Increased Tank Capacity
- [illegible]
- [illegible]

PLATECOIL
Division
KOLD-HOLD MFG. CO.
LANSING 4, MICHIGAN

Mr. Parker:

"Additional experience with ductile iron indicates that it now has definitely established a permanent place as a material for parts and equipment for use in the steel industry.

"Application includes slag ladles, rolling mill housings, guides, table rollers, gear boxes, melting and heat treating pots.

"In service, ductile iron castings are holding up as well as steel, and cost is somewhat lower. We also find ductile iron can be cast in somewhat heavier sections than malleable iron. Minimum tensile strength is 8000 psi.

"Further improvements in continuous pickling of strip are being incorporated into a new line now under construction for Kaiser Steel Corp. at Fontana, Calif., and scheduled for delivery in February. Pressure for steel mill equipment has made necessary for us to expand our Poland Ave. shop and machine shop facilities. A new roll shop will be built this summer, if the necessary steel is allocated for it."

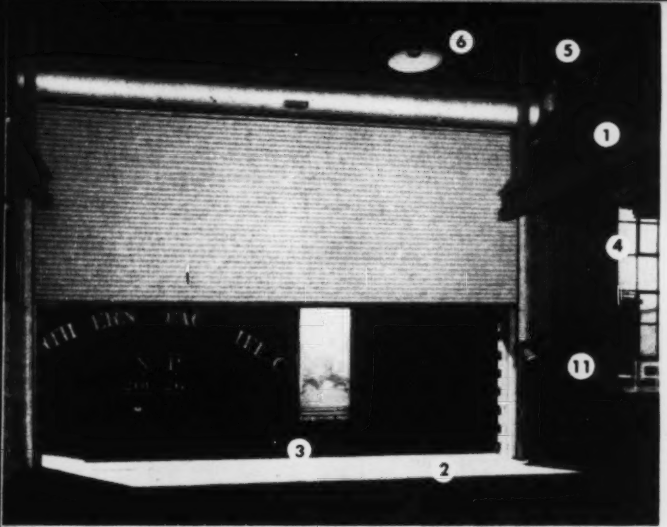
B. G. PARKER, Youngstown Foundry & Machine Co., Youngstown, O.

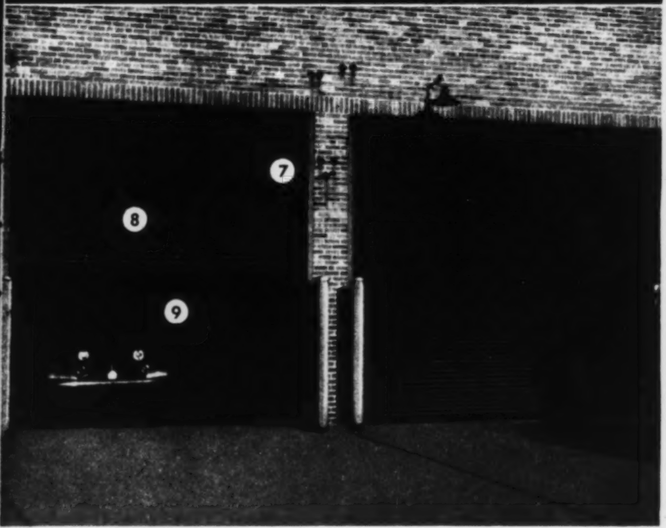
Mr. Erickson:

"HIGHLY refractory metals used in jet engines present complex and difficult problems in tooling and cutting fluid application. One of the most challenging, the elimination of dangerous and expensive carbon tetrachloride from cutting oils for broaching and other difficult machining operations on blades, buckets and disks, has been accomplished in several plants.

"Titanium promises to be something of a headache for machine, tool and cutting fluid engineers. Researches already under way indicate that machining difficulties are many and complex but progress seems assured by competent approach."

HARRY ERICKSON, chief engineer, D. A. Stuart Oil Co. Inc., Chicago.





Opened . . . closed . . . or in action —
From the inside or outside . . .

KINNEAR
Rolling Doors

Give You More Adantages

1. With Kinnear Rolling Doors, all overhead space remains clear for hoist, crane and conveyor equipment or other superstructure. Overhead crane rails, extending only an inch or two from face of door, *can't* interfere with door action.

2. All floor space around Kinnear Rolling Doors is fully usable at all times.

3. No loss of space on narrow loading platforms with Kinnear Rolling Doors. They need no room inside or outside the building for operation.

4. Windows next to Kinnear Rolling Doors are never blocked off when the doors are operated.

5. Supports or other superstructures can be placed close to sides, front and top of Kinnear Rolling Doors—inside or outside the building.

6. Light from overhead fixtures is not obstructed by Kinnear Rolling Doors; they coil compactly above the opening.

7. Wind can't blow Kinnear Doors back and forth or damage them. Edges of the curtain are anchored in steel tracks from floor to ceiling!

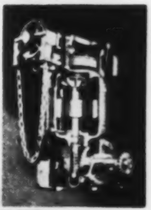
8. Kinnear Rolling Doors open straight upward, ou of the way of traffic, safe from damage.

9. The opening is cleared from jamb to jamb an floor to lintel. No projecting edges or parts to obstruct opening.

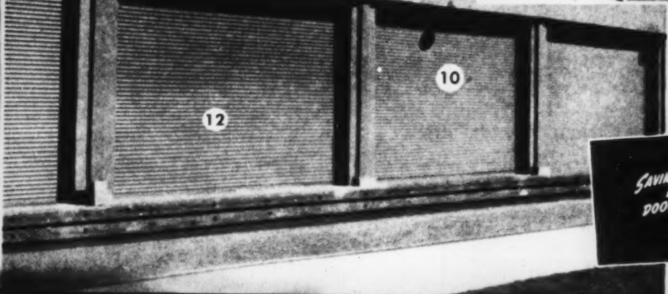
10. A continuous curtain of strong interlocking stee slats gives you extra protection against fire, theft, intrusion, wind, weather and accidental damage.

11. Kinnear smooth upward action is ideal for timesaving motor operation, with convenient remote control. Rugged Kinnear Motor Operators do the trick.

12. Kinnear's interlocking steel slat curtain is no only more rugged and longer lasting, bu permits any number of slats to be individually replaced if accidentally damage Lower maintenance costs!



You get many other advantages in addition to those highlighted above in Kinnea Rolling Doors. They are built any size motor or manual operation. Easily installe in old or new buildings. Write for complete information or recommendations.



The KINNEAR Manufacturing Co

Factories: 1780-1800 Fields Ave., Columbus 16, Ohio
1742 Yosemite Ave., San Francisco 24, California

Offices and Agents in All Principal Cities

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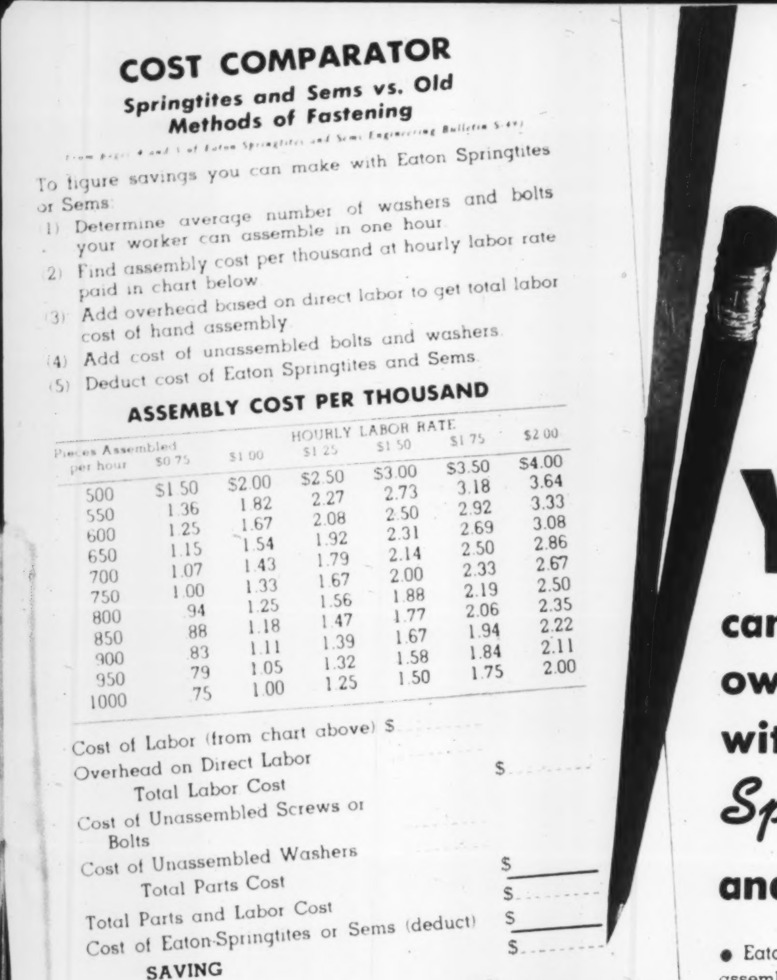
KINNEAR
ROLLING DOORS



COST COMPARATOR

Springtites and Sems vs. Old Methods of Fastening

From Pages 4 and 5 of Eaton Springtites and Sems Engineering Bulletin S-491

To figure savings you can make with Eaton Springtites or Sems:

(1) Determine average number of washers and bolts your worker can assemble in one hour.

(2) Find assembly cost per thousand at hourly labor rate paid in chart below.

(3) Add overhead based on direct labor to get total labor cost of hand assembly.

(4) Add cost of unassembled bolts and washers.

(5) Deduct cost of Eaton Springtites and Sems.

ASSEMBLY COST PER THOUSAND

Pieces Assembled per hour	HOURLY LABOR RATE $0.75	$1.00	$1.25	$1.50	$1.75	$2.00
500	$1.50	$2.00	$2.50	$3.00	$3.50	$4.00
550	1.36	1.82	2.27	2.73	3.18	3.64
600	1.25	1.67	2.08	2.50	2.92	3.33
650	1.15	1.54	1.92	2.31	2.69	3.08
700	1.07	1.43	1.79	2.14	2.50	2.86
750	1.00	1.33	1.67	2.00	2.33	2.67
800	.94	1.25	1.56	1.88	2.19	2.50
850	.88	1.18	1.47	1.77	2.06	2.35
900	.83	1.11	1.39	1.67	1.94	2.22
950	.79	1.05	1.32	1.58	1.84	2.11
1000	.75	1.00	1.25	1.50	1.75	2.00

Cost of Labor (from chart above) $..........

Overhead on Direct Labor ....

Total Labor Cost $..........

Cost of Unassembled Screws or Bolts ....

Cost of Unassembled Washers ....

Total Parts Cost $__________

Total Parts and Labor Cost $..........

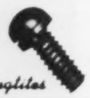
Cost of Eaton-Springtites or Sems (deduct) $__________

SAVING $..........

YOU

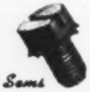
can figure your own savings with EATON *Springtites** and *Sems*†

- Eaton Springtites and Sems cut assembly motions from 8 to 3.
- The saving is obvious — and especially important at today's high labor rates.
- You can get some idea of what it amounts to from the chart at the left.
- If you'd like to know what it would mean to you in dollars and cents, write your nearest Eaton-Reliance office for prices on your requirements.



* ***Springtites***

Quality Reliance Spring Lock Washers of proper size and weight pre-assembled on bolts or screws ready for the assembly



† ***Sems***

Same as Springtites but with multi prong washers of any type instead of spring lock washers

PROMPT DELIVERY on standard sizes

Springtites and SEMS

PRE-ASSEMBLED WITH ALL TYPES OF SCREWS AND WASHERS

EATON **RELIANCE DIVISION, MASSILLON, OHIO**

Sales Offices: New York, Cleveland, Detroit, Chicago, St. Louis, San Francisco, Montreal
In Canada: Eaton Automotive Products, Ltd., London, Ontario

Fastening & Assembling

● NOT TOO many years ago, a manufacturer had few choices in selecting methods for assembling his products. Designers, of course, have done a great deal since to simplify products for the purpose of cutting down on assembly time. Hand in hand, has been development of assembly line techniques, quick-acting fixtures and the like. In addition, literally hundreds of new types of fasteners and machines have come along for applying fasteners at lightning speed; and a dozen new, improved methods for welding, brazing and soldering.

Shielded inert gas metal arc welding, employing argon, for fabrication of aluminum, now can be used for joining ferrous metals. In arc welding there is a further trend toward use of semi-automatic and automatic machines. Resistance welding is being applied in the jet engine field.

Not to be overlooked are composite brazing materials for providing better bonds, and methods for brazing aluminum bronzes and beryllium coppers to steel.

Mr Davis:

"USE of welding in structures was specified by govenment regulation during World War II to conserve steel. European countries have long employed welding to help stretch their critical supplies. The welding industry, therefore, can look without question to making an important contribution to solving problems becoming more serious in metalworking.

"More and more structural steel is being welded as knowledge of design and techniques increases and as building codes are changed. Savings of total tonnage in welded steel structures range from 5 to 20 per cent.

"A marked trend is also evident in the amount of machinery that is being made of fabricated steel. Savings in weight of 50 per cent are normal. Not only are machines made with less material through the reduction in section thickness, but also because of the properties of steel machines are being made more rigid and stronger, to be operated to closer tolerances at higher speeds."

Dr Oehl :

"APPLICATION of flash butt welding in fabrication of jet engine components is progressing. The process has become of particular importance with the use of high strength, high temperature alloys whose superior properties are achieved either through heat treatment or hot-cold work. Since no filler metal is used in making the joints, weld areas respond to processing in the same manner as the parent material.

"Development work is currently being conducted on a variety of dissimilar material combinations joining high temperature alloys with ferrous and nonferrous materials possessing desirable characteristics such as wear resistance, weight and heat conductivity.

"On carbon and constructional alloy steels, flash butt welding has found increased application. Modern machines with improved hydraulic systems and controls are capable of consistent quality performance. This has led to the increased use of flash welded joints in heat treated parts made from forgings and bar shapes."

Mr Kinkead:

"SCIENCE and art of welding has advanced rapidly as a consequence of atomic energy and jet engine developments. Heliarc welding, it can be foreseen, may find application in welding ferrous metals. Present applications are valid in spite of high cost of gases and tungsten. Present methods of using the gases are wasteful and improved methods will be used.

"The welding industry as a whole is reacting intelligently to present conditions. Government refusal to allocate materials for welding machines and electrodes during the scare buying period probably was a good thing in the long run. Few pieces of welding equipment side-lined after the last war are being put back into use. Sales and service personnel are out helping their present and future customers do a better job; they are not interested in selling more equipment.

"Look for important developments in solid phase welding which are coming as a consequence of developments in other processes."

Mr Sieger:

"HOTTEST thing in resistance welding is fabrication of jet engine alloys. All of the alloys involved lend themselves to resistance welding, and in a few special instances is the only satisfactory method of fabrication. Because of the low electrical conductivity of this group of alloys, the problem in resistance welding is not so much that of high electrical power (in contradistinction to aluminum) but to high pressures—because of the high strength alloys used equipment must be husky.

"One of the most controversial discussions is not about the quality of the final end point component, but rather the type of equipment best suited to produce it. The debatable question: Is the equipment to be single phase or three phase? It is a fact that satisfactory quality and quantity components can be produced by both types. The arguments seem to center in those localities where the supply of electrical energy may be restricted—then the three phase equipment has advantages. Costwise, single phase equipment is

A. F. DAVIS

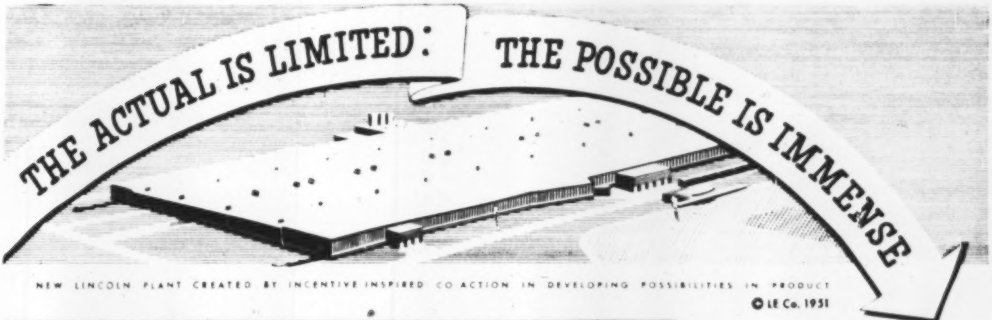
vice president, Lincoln Electric Co.,
Cleveland

IRVING A. OEHLER

director of metallurgy & research, American Welding & Mfg. Co., Warren, O.

ROBERT E. KINKEAD

consulting engineer,
Cleveland



NEW LINCOLN PLANT CREATED BY INCENTIVE INSPIRED CO-ACTION IN DEVELOPING POSSIBILITIES IN PRODUCT

© LE Co. 1951

MACHINE BUILDER SIMPLIFIES SERVICE PROBLEMS WITH WELDED STEEL

By **Walter E. Vuchnich**
Welding Engineer
Milwaukee, Wisconsin

IN the original design of the side frame member (Fig. 3), service replacement of babbitt bearings for cross shafts required extensive disassembly of the machine. With the welded design (Fig. 4), however, it is now possible to utilize self-aligning roller bearings held in retainers that are simply bolted to the side frame member. All servicing can be done on the job with minimum down time.

The present welded design also affords other important benefits in manufacture. 49% less metal is needed. What little machining is necessary is done on light, fast machine tools. Shop assembly is simpler and can be done with fewer man-hours.

The shop cost of the welded steel frame is 21% less than that of the original construction.

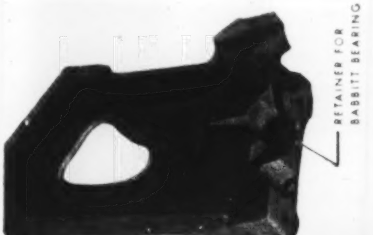


Fig. 3 — Original construction *of side frame member weighed 47 pounds and required larger machine tools for boring the retainers for babbitt bearings.*

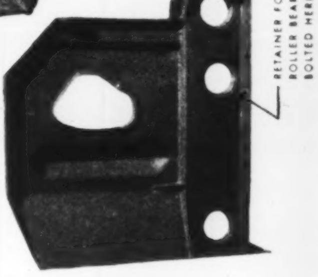


Fig. 4 — Present welded steel design. *Side members are formed from sheet steel. Individual retainers for self-aligning bearings are held to sides with three bolts. Photos courtesy The Fox River Tractor Company, Appleton, Wisconsin.*

PROPER DESIGN IN WELDED STEEL ALWAYS IMPROVES PRODUCT AND LOWERS COST

Fig. 1—Original design *of machine feeder roll required 63 pounds of iron.*

STRONGER, MORE RUGGED

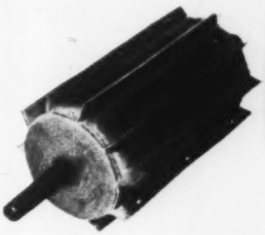


Fig. 2—Weldesign in steel takes 55% less material. *Costs 45% less to build. Eliminates former breakage in service.*

HERE'S MORE PROOF

Machine Design Sheets are available to designers and engineers. Simply write on your letterhead to Dept. 61.

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FABRISTEEL
"FAST ON" CLINCH NUTS
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Can't work loose
Permits use of lighter gage stock
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Strom has been making precision metal balls for over 25 years for all industry and can be a big help to you in selecting the right ball for any of your requirements. In size and spherical accuracy, perfection of surface, uniformity and dependable physical quality, there's not a better ball made.

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much less expensive and is said to be the more readily maintained. Three phase equipment on the other hand, is massive, expensive and complicated."

Mr. Koopman:

"IN WELDING high-temperature alloys, the Heliarc inert gas-shielded tungsten arc process offers several advantages. Heliarc butt welding is displacing resistance lap welds because of lower equipment costs, greater portability of equipment, wider process application range, and fewer power supply problems. These fusion butt welds are preferred because eccentric loading and notch effects are eliminated; fatigue limit and strength are improved; weight is reduced; gas flow is improved past the smooth butt joints; and the fusion butt welds are more easily inspected, tested, and repaired.

"Heliarc welding is being adapted in place of other fusion welding methods for several reasons: (1) Grinding and finishing costs are reduced because no flux is required and smooth welds free of spatter are produced. (2) The absence of smoke improves visibility and allows better control of the weld. (3) Closer control of weld metal composition is possible. (4) Filler rod need not be used on some jobs. (5) Completely mechanized installations can be made.

"All three types of Heliarc welding — manual, semiautomatic, and fully mechanized—can be used, depending upon the joint contour,

G. N. SIEGER
president, S-M-S Corp.,
Detroit

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This Man is an EASY-FLO and SIL-FOS brazing expert... He can tell you where and how these low-temperature silver brazing alloys can save you money... He knows proper brazing design and can tell you how to join ferrous, non-ferrous and dissimilar metals... He's thoroughly versed in production brazing methods... He's had lots of experience on domestic and defense operations... He can show you quick ways to train brazing operators.

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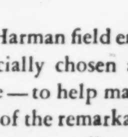

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on every Arcos
Stainless Electrode
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ARCOS

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GUARANTEE Better Weld Metal

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ARCOS CORPORATION
1500 South 50th Street • Philadelphia 43, Penna.

Specialists in Stainless, Low Hydrogen and Non-Ferrous Electrodes

length, material thickness, and number of pieces that are to be welded.

"As the scarcity of certain alloying elements forces the use of less expensive metals, better designs will have to be resorted to, such as placing welds at or near the neutral axis to reduce stresses; air cooling of hot parts to prolong the life of the lower alloyed metals; using more welded combinations of dissimilar alloys so that the scarce alloys are used only in those small areas where absolutely needed; and using fusion butt welds in place of resistance lap welds."

Mr. Meadowcroft:

"REGARDLESS of hot war, cold war or peace, use of welding techniques, processes and equipment will continue to increase productivity, reduce cost, and improve quality of all metal welded products.

"Today all information is recorded and available from the inception of an idea, through design, development and production. Numerous papers and articles have been published and the mission of welding to industrialize the world is carried by the printed or spoken word in many languages. Applications to newer structures are exhibited at conference displays and/or in manufacturing plants."

"Progress with which scientific methods are being applied to more recent welding techniques is due in considerable part to the work of

K. H. KOOPMAN
development engineer, Linde Air Products Co., New York

welding, metal, or other allied-interest organizations. By such means great strides will continue to be made in the use of varied metal structures and the application of all methods of welding."

Mr. Herbst:

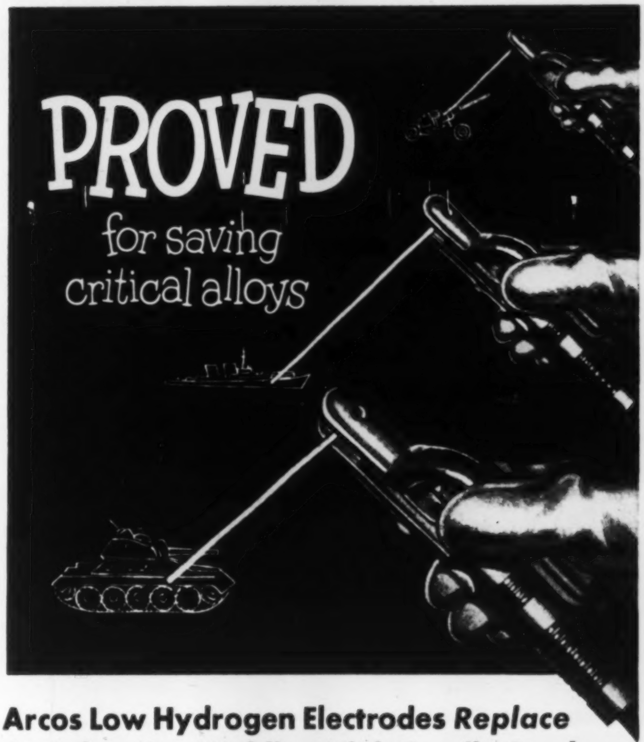
"EXTENSIVE experimental work in 1950 resulted in the commercial introduction in 1951 of a mixture of oxygen and argon known as argon-sigma grade. Practical application of this new gas mixture to the sigma welding of carbon steel has this year substantiated the experimental conclusions.

"Extensive weld testing shows that under proper operating conditions quality can be obtained equal or superior to that obtainable with standard flux-coated electrodes. A type of killed carbon steel rod available for the sigma process produces physical values and x-ray quality comparable to those required of the E6010 and E6011 classes of flux-coated electrodes. Another killed rod of low-alloy content produces physical values comparable to those specified for the E6012 and E6013 classes with weld soundness somewhat above requirements for these classes of electrodes.

"From a practical point of view, for some repetitive production applications the high metal deposition rate and continuous character of the sigma process produces astounding economies. The rate of welding may be two to three

J. W. MEADOWCROFT

asst. works mgr., automobile body div., Budd Co., Philadelphia



Arcos Low Hydrogen Electrodes *Replace Stainless* For Welding High Tensile Steels

● Each day sees a growth in the requirements of nickel and chromium for defense production. The increased use of low hydrogen electrodes on welding high tensile steels is helping to free more of these critical alloys.

ARCOS low hydrogen electrodes are far removed from the experimental stage—they've already been "time tested and approved" on armor welding, as well as commercial applications. With them you get trouble-free, uniform welding performance because every one must pass the same rigid quality controls set up for Stainless.

ARCOS CORPORATION
1500 South 50th Street • Philadelphia 43, Penna.

WELD WITH ARCOS

Specialists in Stainless, Low Hydrogen and Non-Ferrous Electrodes

Cleveland has specialized for 35 years in making a few items well—

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Cap Screws • Set Screws • Milled Studs

Specialization at "Cleveland Cap" guarantees closer attention to accurate production, rigid inspection, and prompt shipment (as conditions permit). Our capacity is concentrated on standard Cap Screws in an unusually wide range of sizes—all popular heads; square head Set Screws, and Milled Studs. We also have capacity for producing your special design headed and threaded parts by cold extrusion. See your jobber for *standard* items; write us about your "specials."

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2917 East 79th Street, Cleveland 4, Ohio

Warehouses: Chicago • Philadelphia • New York • Providence

CLEVELAND *Top Quality* FASTENERS

originators of the Kaufman
DOUBLE EXTRUSION
Process

times higher than is possible with best flux-coated electrode techniques. In addition, sigma welding shows substantial advantages from the operating factor standpoint."

Mr. Hoglund:

"DEVELOPMENT of welding, soldering and brazing methods for aluminum alloy parts has been intensified. Many new applications of aluminum alloys and many changes in joining practices had to be accomplished to meet the government restrictions.

"An important development is the wide use of inert gas shielded metal arc welding either with a tungsten electrode or continuously fed aluminum electrode. The latter makes it possible to weld ship structure and plating in a heat treated aluminum alloy. Tank cars in metal thicknesses 1-inch and over in strong aluminum alloys are now assembled by arc welding. Experimental welding on aluminum alloys at least twice the strength of conventional alloy 3S plate for unfired pressure vessels has been accomplished and production welding will be attempted in the near future.

"Assembly of radiators by dip brazing indicates this method is potentially suitable for production on a scale commensurate with the requirements of the automotive industry. Special aluminum materials have been developed which provide both a source of brazing filler metal and anodic protection

H. T. HERBST

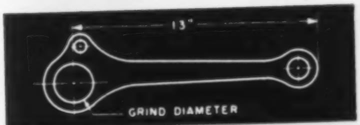
development engineer, Linde Air Products Co., New York

What's in Vermont this month?

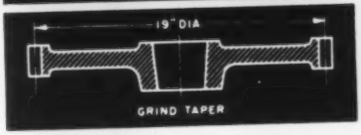
NOW, PROFITABLE PRECISION IN HEAVY INDUSTRY. Contrary to popular belief, it is cheaper in the long run to make even heavy parts to precision limits. Even today, many parts on looms, presses, and stationary engines are roughed out and either selective or hand fitted. The result is low cost in machining but high costs in assembly, maintenance, and repair.

With these same parts produced to precision dimensions, the element of interchangeability is introduced. The machining costs may be increased, but assembly time, repair parts, inventory and repair expenses are substantially reduced.

Because the Bryant No. 1126 is designed to handle large parts with speed and accuracy, it can finish a number of different pieces in an assembly. You may find that the saving in other departments will pay for your Bryant No. 1126 in a short time.



GRIND DIAMETER

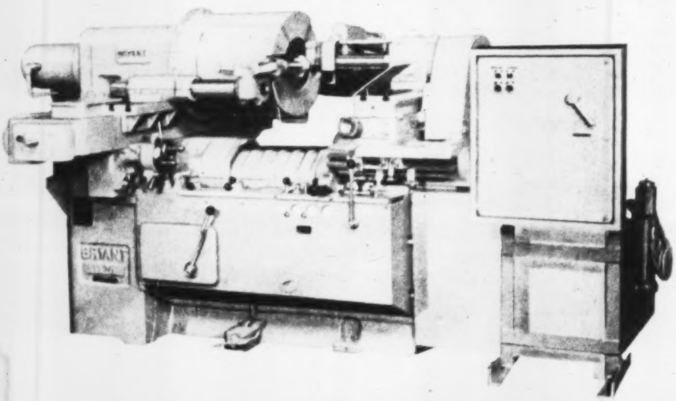


GRIND TAPER

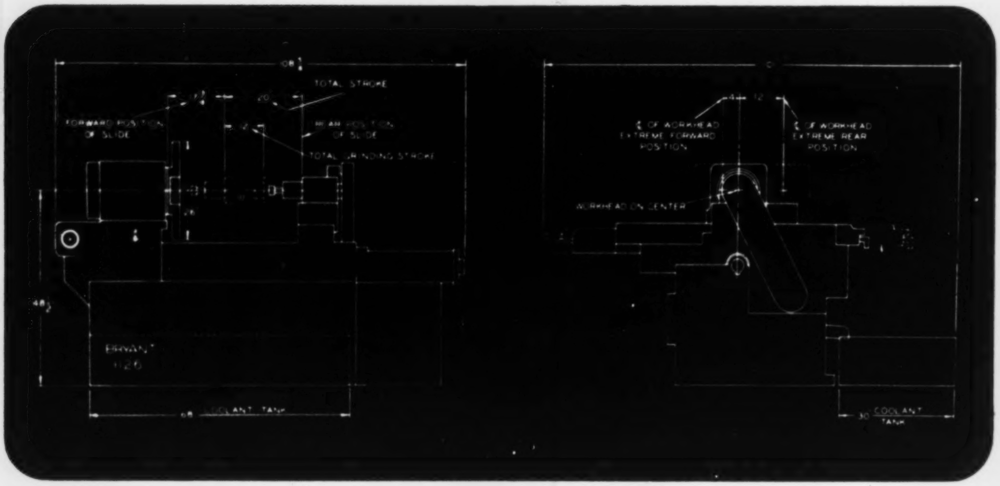
Bryant Chucking Grinder Company in Springfield, Vermont, U.S.A.

FOR HOLE GRINDING

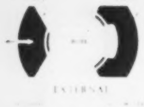
The Bryant 1126 Precision Hole Grinder

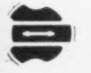


This heavy duty, semiautomatic machine, with hydraulic controls, has a 26" swing and will grind holes with a maximum depth of 12". Although designed for large, heavy work, a selection of wheelheads is available to grind holes as small as 1" in diameter. The extremely rugged bed provides the strength and rigidity necessary for vibrationless operation. The workhead has two positions, one for grinding and a forward position for ease in loading and checking large work. The wheelhead is adjustable to grind work up to 15° included angle. The Bryant workhead and wheelhead slides are antifriction to provide extremely accurate grinding and sensitive control. Write for new illustrated folder.


108 1/4
TOTAL STROKE
17
20
FORWARD POSITION OF SLIDE
12
REAR POSITION OF SLIDE
TOTAL GRINDING STROKE
26
48 1/2
BRYANT 1126
68 COOLANT TANK
4
12
℄ OF WORKHEAD EXTREME FORWARD POSITION
℄ OF WORKHEAD EXTREME REAR POSITION
WORKHEAD ON CENTER
30 COOLANT TANK

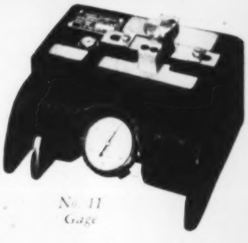
FOR QUANTITATIVE READING OF THREAD FIT


EXTERNAL


INTERNAL

The Bryant Thread Gage

The Bryant Thread Gage gives one accumulated reading, on a dial indicator, of P.D., form and lead — a definite indication of assemble ability! Drawings at left show the Bryant principle of an "expanding" master plug for checking internal parts, and a "contracting" master ring for checking external threads. The threaded part is dropped between (or over) the segments, operating lever is released, segment contact is made on all the threads, a partial turn of the part inspects the thread all over. *The Bryant gage is 4 to 5 times faster than plug or ring gaging.* Write for folder.


No. 11 Gage

Bryant Chucking Grinder Company in Springfield, Vermont, U.S.A.

against corrosion of the inside of a radiator.

"It is possible to produce solders which minimize use of tin and cadmium without impairing workability or resistance to corrosion. Moreover, these new solders are equal in performance to general purpose solders used prior to government restrictions. Same is true for solder fluxes for aluminum."

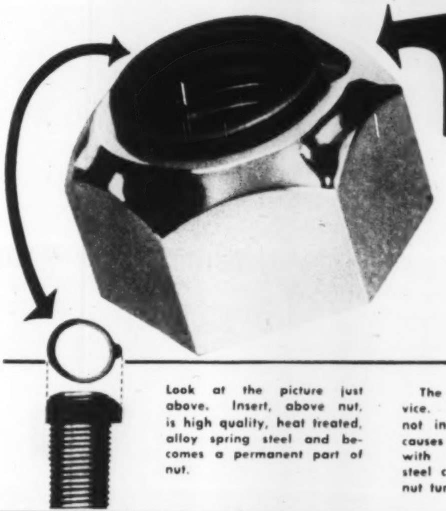
Mr. Plummer:

"FABRICATORS and erectors of field assembled storage and process vessels continue to meet successively the problems created by demand for larger units with more exacting service requirements. Storage tanks having diameters in excess of 200 feet are being more generally used. Plans are being completed for erection of a pressure-vacuum sphere having a diameter of 72 feet, 6 inches. Preliminary designs have been prepared for a pressure sphere with a diameter of 175 feet. One company has constructed several multiple-intersection vessels designed to provide large capacity at high pressure without requiring the use of maximum plate thicknesses in excess of those which can be easily and economically welded.

"The three divisions of the Pressure Vessel Research Committee of the Welding Research Council are continuing investigations to secure basic information which will assist the various code writing groups in preparing design and

G. O. HOGLUND
Aluminum Co. of America, New Kensington, Pa.

A NEW FASTENER YOU CAN'T SHAKE LOOSE!



....WITH A NEW FEATURE FOR A BETTER GRIP!

- Self locking in any position.
- Does not require bolt tension.
- Can be re-used any number of times.
- Complete as a unit. Install like any ordinary nut.

Look at the picture just above. Insert, above nut, is high quality, heat treated, alloy spring steel and becomes a permanent part of nut.

The insert is a locking device. Load is borne by nut, not insert. Elliptical shape causes retainer to grip bolt with tension only spring steel could exert to prevent nut turning.

THERE is no other fastener or lock nut like this! It stays put where you wrench it even in face of vibration that would wreck the bolt.

It does not require *bolt tension* but stays in place on a loose bolt. It can be readjusted, removed and replaced, *any number of times* without materially reducing the torque of locking power or injuring the bolt. No extra parts to slow up installation—nothing to line up or shear.

Authoritative tests have proved conclusively the gripping power of Security Locknuts. If you have a vibration or fastening problem, Security Locknuts are the dependable, positive solution. Ask to see the Security Locknut tests.

SECURITY LOCKNUT CORPORATION
North Ave. and 15th Ave., Melrose Park, Ill.

Security
The Nut You Can't Shake Loose

SPECIAL OFFER! Here's an easy way to arrive at thread tolerance figures. Ask for a Security Thread Tolerance Chart. Just spin the dial and you have the figure you need. Send the coupon. It's yours for the asking.

SECURITY LOCKNUT CORPORATION
North Ave. and 15th Ave., Melrose Park, Ill.
Please send me without obligation:
☐ One of your Thread Tolerance Charts.
☐ We have a fastener problem and would like to know more about Security Locknuts.
Company Name
Address
Town Zone State
Signed

"MULTICUT" "TUFCUT" "HOT WORK"

Wapakoneta
SHEAR BLADES
and ROTARY KNIVES

Any type or size blade of proper Alloy with correct hardness and temper for every type shearing machine and every kind of job.

Rx ENGINEERED TO THE JOB

Every Wapakoneta blade is made to exact specifications, designed for the particular job. Complete records with order number of each blade makes possible duplication of exact size and temper at any time.

The
WAPAKONETA MACHINE CO.
Shear Blade Specialists Since 1891
Wapakoneta, Ohio

fabrication procedures which will make possible the more economical construction of vessels of assured safety. This year correlated research programs will be conducted at Lehigh University, University of Illinois and Ecole Polytechnique at Montreal, comparing under simulated service conditions physical properties of the usual low carbon steels used in pressure vessels and those of low alloy, high strength steels which might be used."

Dr. Slottman:

"DEMAND for increased speed and higher efficiency is causing the metals-producing and fabricating industries to look for specific rather than general purpose techniques, processes and metals. As in modern medicine, we seek the aureomycins and the penicillins to give speedy relief rather than relying on nature to cure itself. Examples are the use of oxygen in decarburizing steel, and as a specific for the ills of cupola operation, the use of calcium carbide in basic lined cupolas for improved metal properties, and in acid practice for desulphurizing.

"In the fabricating field, the newer highly specialized welding processes using inert gas shields are being continuously modified to meet the specific requirements. No one is content today that a given tool will do a fair job. There is continuous pressure for specialized techniques to get the utmost from the tool on each type of job. While this trend is throwing an increas-

FRED L. PLUMMER

director of engineering, Hammond Iron Works, Warren, Pa.

13 out of 15
Locomotive Builders

In the locomotive building industry Murex electrodes are normally used for production welding by 13 out of 15 foremost producers.*

Murex electrodes are preferred in locomotive building, first, because they make possible high speed welding essential to maximum production — second, because they can be depended on for consistent, day-in-day-out results in meeting exacting specifications for weld soundness and physical properties.

*Those with AAAA financial ratings.

WELD WITH...

MUREX

METAL & THERMIT CORPORATION

100 EAST 42nd ST., NEW YORK 17, N. Y.

Electrodes • Arc Welders • Accessories

STANDARDS and SPECIALS by the Millions

THE FERRY CAP & SET SCREW CO.

2159 SCRANTON ROAD • • • CLEVELAND 13, OHIO

"SHINYHEADS"

America's Best Looking Cap Screw

Made of high carbon steel — AISI C-1038 — to standards for Full Finished hexagon head cap screws — bright finish. Heads machined top and bottom. Hexagon faces clean cut, smooth and true, mirror finish. Tensile strength 95,000-110,000 p.s.i. Carried in stock.

"HI-CARBS"

Heat Treated Black Satin Finish

Made of high carbon steel — AISI C-1038. Furnished with black satin finish due to double heat treatment. Hexagon heads die made, not machined. Points machine turned; flat and chamfered. Tensile strength 130,000-160,000 p.s.i. Carried in stock.

"LO-CARBS"

Made of AISI C-1018 steel — bright finish. For use where heat treatment is not required and where ordinary hexagon heads are satisfactory. Hexagon heads die made to size — not machined. Points machine turned. Tensile strength 75,000-95,000 p.s.i. Carried in stock.

SET SCREWS

Square head and headless — cup point. Case hardened. Expertly made by the pioneers in producing Cup Point Set Screws by the cold upset process. Cup points machine turned. Carried in stock.

FILLISTER CAP SCREWS

Heads completely machined top and bottom. Milled slots — less burrs. Flat and chamfered machined point. Carried in stock.

FLAT HEAD CAP SCREWS

Heads completely machined top and bottom. Milled slots — less burrs. Flat and chamfered machined point. Carried in stock.

*

"SHINYLAND" STUDS

All studs made steam-tight on tap end unless otherwise specified, with flat and chamfered machined point. Nut end, oval point. Land between threads shiny, bright, mirror finish. Carried in stock.

ADJUSTING SCREWS

Valve tappet adjusting screws — Hexagon head style — to blue print specifications — hexagon head hard; polished if specified — threads soft to close tolerance — points machine turned, flat and chamfered.

*

CONNECTING ROD BOLTS

Made of alloy steel — heat treated — threads rolled or cut — finished to extremely close thread and body tolerances — body ground where specified. Expertly made by the pioneers in producing connecting rod bolts by the cold upset process.

*

SPRING BOLTS

Case hardened to proper depth and ground to close tolerances. Thread end annealed. Supplied in various head shapes, with oil holes and grooves of different kinds, and flats accurately milled.

FERRY PATENTED ACORN NUTS

For ornamental purposes. Steel insert — steel covered. Finish: plain, zinc plated, cadmium plated. Size: 9/16", 3/4", 15/16" across the flats.

Tapped 1/4" to 3/4" inclusive. Cross section of Ferry patented acorn nut, showing how steel hexagon nut fits snugly into shell.

Pioneers and Recognized Specialists, Cold Upset Screw Products since 1907

STANDARDS

carried by

LEADING

DISTRIBUTORS

*

SPECIALS

furnished to

BLUE PRINT

SPECIFICATIONS

WRITE FOR INFORMATION

SEND FOR SAMPLES

ing burden on the development groups serving the metals industries, it is creating an imposing number of new types of equipment and processes which permit these industries to produce their products better and faster."

Mr. Nussbaum:

"WIDE-SPREAD applications have been found for composite brazing metals, a development aimed at obtaining positive control of the flow of molten brazing alloy within a joint. When the brazing alloy is bonded metallurgically to a parent metal, either ferrous or nonferrous, the diffused surface layer of brazing alloy remains anchored in place during the entire brazing cycle, thus assuring a reliable joint.

"Composite brazing metals are made by cladding one or both surfaces of the parent metal with any desired brazing alloy and rolling the resulting composite bar to the required strip gage. They are being used extensively in the form of both single and double-clad strip where brazed joints have to withstand severe mechanical and hydraulic tests, where brazing alloy preplacements are difficult to position and where the joint area is too intricate or inaccessible."

Mr. Setapen:

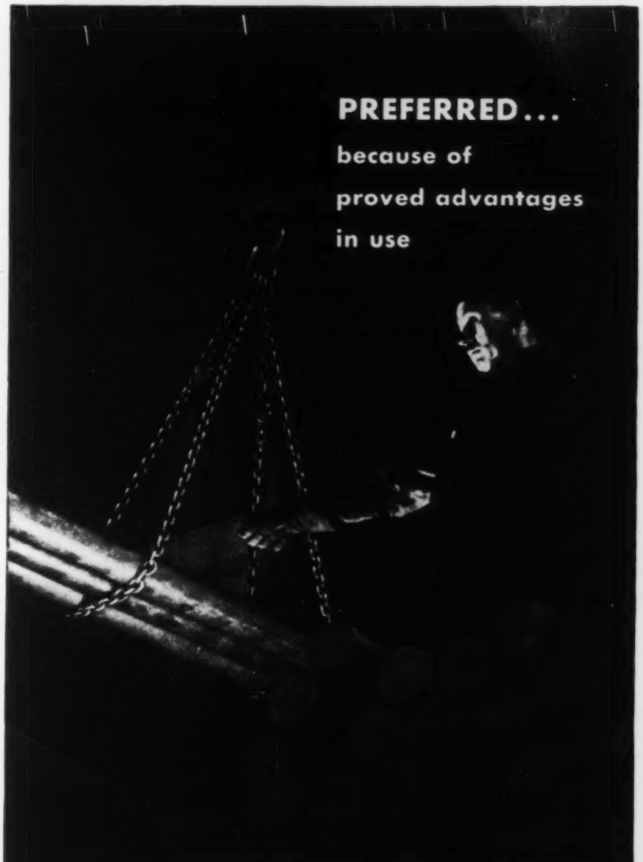
"IN joining aluminum-bronze to steel the aluminum picked up by the brazing alloy may cause a weak bond. A brazing alloy containing

G. V. SLOTTMAN

director of research & engineering, Air Reduction Sales, New York

HERC-ALLOY

SLING CHAINS



PREFERRED...
because of
proved advantages
in use

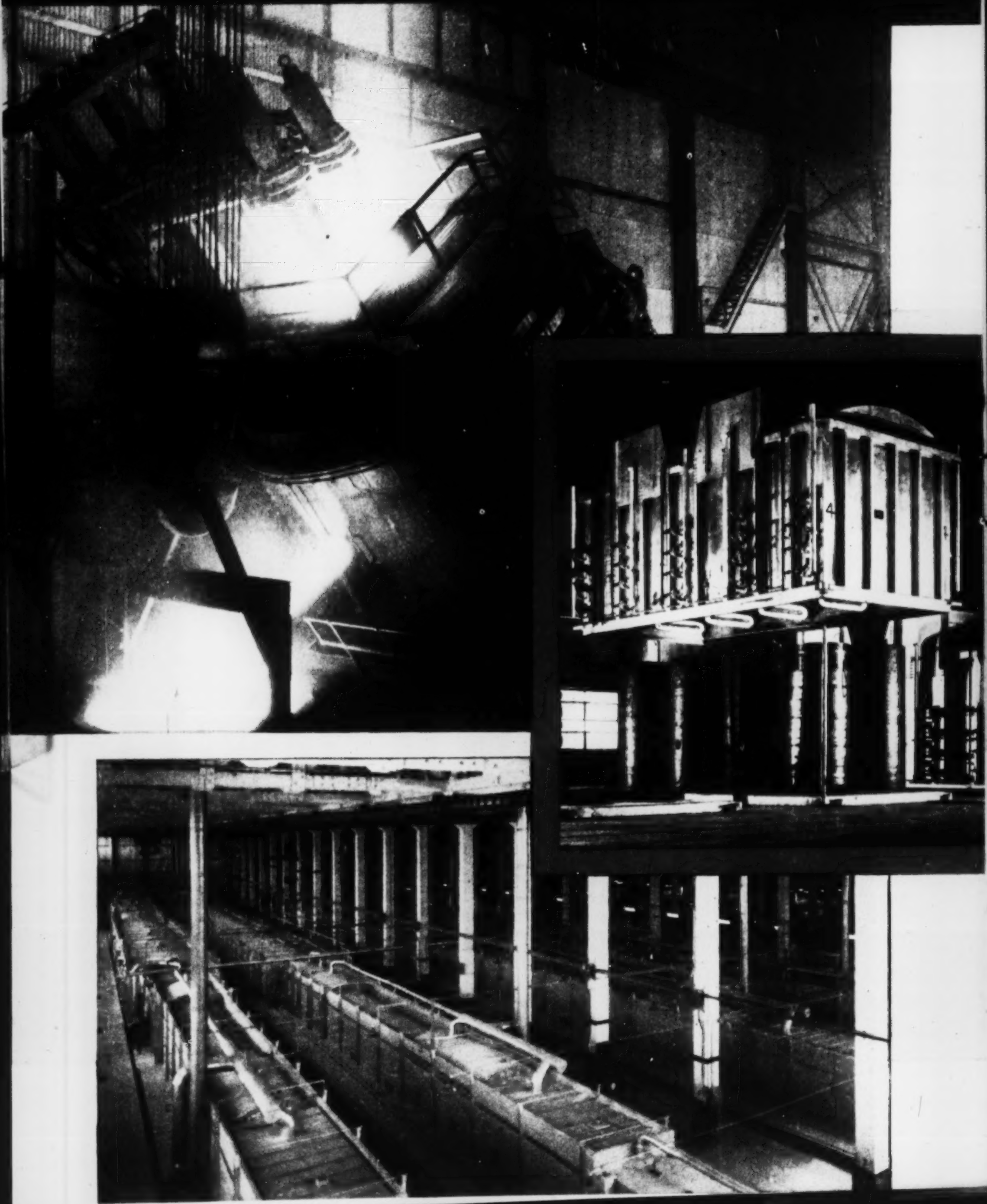
Production Executives and Safety Directors look for many things in a sling chain — greatest strength, maximum safety, lighter weight, handling ease, resistance to wear, minimum cost against service life.

Because they found all these advantages in HERC-ALLOY by on-the-job experience, it became a matter of course to prefer and specify HERC-ALLOY Sling Chains.

Write for illustrated Data Book No. 3 which contains helpful information on sling chain selection and use.

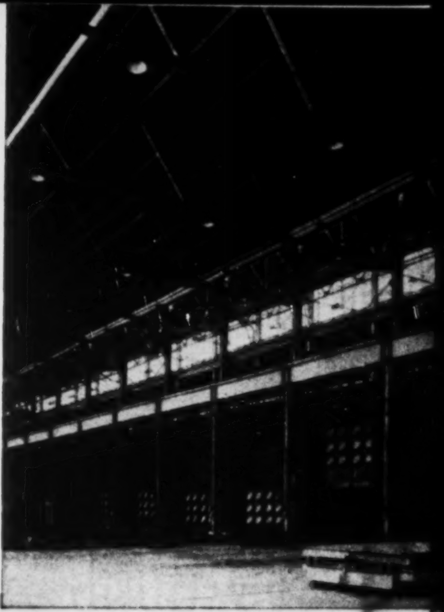
COLUMBUS McKINNON CHAIN CORPORATION
(Affiliated with Chisholm-Moore Hoist Corp.)
GENERAL OFFICES AND FACTORIES: TONAWANDA, N. Y.
District Offices: New York • Chicago • Cleveland
Other Factories at Angola, N. Y., Dixon, Ill., St. Catharines, Ont., Can., and Johannesburg, South Africa.

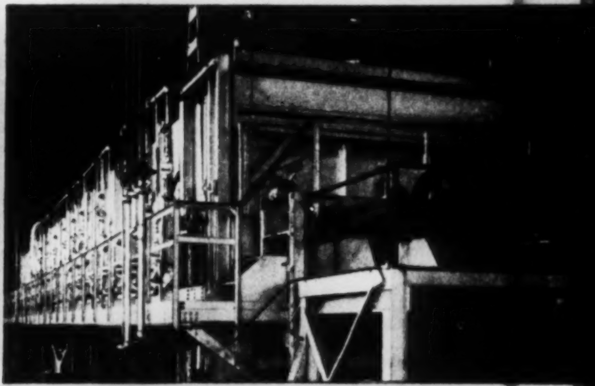
SWINDELL-DRESSLER



Industrial Furnaces

Effectively Aiding
GREATER PRODUCTION of
Metals and Ceramics Essential
to the National Defense Program





SWINDELL-DRESSLER *Corporation*

PITTSBURGH 30, PA.

8 SOUND REASONS why there is no substitute for STRUCTURAL STEEL

The structural steel experience and facilities of this 56-year old organization are available to you any time, anywhere.

STRENGTH
The world's most widely used material has the ability to withstand enormous pressures and stresses.

UNIFORMITY
Precise specifications and constant chemical and physical tests assure unvaried uniformity.

ADAPTABILITY
Steel frame buildings readily lend themselves to new styles and changing needs which insures long life to structures.

FIRE SAFETY
Steel will not burn. There are no structures more inherently fire-safe than the modern skyscraper, built with a steel frame.

VERSATILITY
The great variety of standard shapes and dimensions enables structural steel to be used for any structural problem.

ERECTION SPEED
Steel frame construction proceeds swiftly because every member is a finished product ready to be placed in the structure.

SALVAGE
Because steel retains its strength and dependability, it can be economically removed for use in new structures and for scrap.

ECONOMY
All these factors combine in saving money for the investor and the owner.

Fort Pitt BRIDGE WORKS

Member American Institute of Steel Construction
General Offices, Pittsburgh, Pa. . . . Plant at Canonsburg, Pa.
DISTRICT OFFICES
NEW YORK N. Y. • CLEVELAND, OHIO
DETROIT, MICHIGAN
"Steel Permits Streamlining Construction with Safety, Endurance and Economy"

a small amount of nickel mitigates the trouble, probably by tying up the aluminum as an intermetallic compound. Brazing of beryllium-copper to steel is benefitted.

"Tensile strengths of 140,000 to 160,000 psi are obtained in a hard temper copper base alloy containing 6½ per cent silver. Electrical conductivity is 70 to 80 per cent of that of pure copper. Material is furnished in narrow strip and flat wire or round wire at prices comparable to beryllium-bronze and is being used in instrument parts. Since high strength is obtainable only by cold working, soft temper alloy cannot be hardened by heat treatment. Formability is therefore limited to simple, easy bends. However, the material may be blanked and machined readily."

A. M. SETAPEN, manager, engrg. div., Handy & Harmon, New York.

Mr. MacGuffie:

"ARC welding industry, spurred by the heaviest demand since World War II, produced greatly improved equipment in large quantities; devoted most of its electrode development and research to the search for substitute materials; and showed a significant trend toward the use of automatic and semiautomatic machines.

"Of major importance is improvement in the arc stability of AC machines used for heavy-duty operation, such as for welding armor plate. This was the result of

A. I. NUSSBAUM
met. eng., American Silver Co., Flushing, N. Y.

Striking Campaign in

The Saturday Evening POST

***continued for 1952** . . . users of Phillips Cross-Recessed-Head Screws reap the benefit*

Once again readers of The SATURDAY EVENING POST are being told to look for the clue to quality: Phillips Cross-Recessed-Head Screws. Take advantage of this powerful promotion by assembling your products with these quickly identified fasteners. You save time, work, money because Phillips Screws . . . Wood, Machine, Tapping or "Sems" . . . start faster, eliminate driver skids, damaged parts, split screw heads. What's more, they add structural strength. Be sure to include the clue to quality in your specifications!

Can you find the clue...

...to quality? ✕ *marks the spot...*

Yes! a **PHILLIPS SCREW**

PERFECTLY MATED! Only Phillips Drivers are perfectly mated to Phillips Screws. Look for the name Phillips on the shank.

✕ marks the spot... the mark of extra quality

PHILLIPS *Cross-Recessed-Head* **SCREWS**

manufactured by

AMERICAN SCREW CO. • ATLANTIC SCREW WORKS, INC.
THE BLAKE & JOHNSON CO. • CAMCAR SCREW & MFG. CORP.
CENTRAL SCREW CO. • CONTINENTAL SCREW CO. • THE EAGLE LOCK CO.
ELCO TOOL AND SCREW CORP. • GREAT LAKES SCREW CORP.
THE H. M. HARPER CO. • ILLINOIS TOOL WORKS • THE LAMSON & SESSIONS CO.
NATIONAL LOCK CO. • NATIONAL SCREW & MFG. CO.
PARKER-KALON CORP. • PHEOLL MFG. CO.
ROCKFORD SCREW PRODUCTS CO. • SCOVILL MFG. CO.
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STRONGHOLD SCREW PRODUCTS, INC. • WALES-BEECH CORP.

THE FASTENERS OF TODAY . . . AND OF THE FUTURE

ENGINEERS

TO DESIGN, REDESIGN, OR DEVELOP YOUR PRODUCT

ENGINEERS

TO TOOL AND EQUIP YOUR PLANT FOR THE BEST PRODUCTION ECONOMICS

ENGINEERS

TO GET YOUR NEW PRODUCTION GOING AND KEEP IT GOING

ENGINEERS

TO REDUCE YOUR COSTS AND IMPROVE YOUR QUALITY

PIONEER ENGINEERING & MANUFACTURING CO., INC.

ENGINEERS, DESIGNERS, CONSULTANTS AND PRODUCTION SPECIALISTS

19662 JOHN R STREET
DETROIT 3, MICHIGAN

INQUIRIES PROMPTLY ANSWERED

design changes made after exhaustive tests on many different types of electrodes under a wide variety of welding conditions.

"Also noteworthy is the progress made in the development of substitute electrodes for high-nickel content rods.

"Trend toward use of automatic and semi-automatic installations continues, particularly in the field of inert gas shielded welding. This results from heavy demand for mass-produced fabricated metal parts for the defense program."

C. I. MacGUFFIE, manager sales, welding division, General Electric Co., Schenectady, N. Y.

Mr. Berryman:

"UNDER impetus of defense production engineers have taken a sharper look at inert gas shielded metal arc welding in solving specialized problems and are finding unsuspected plus values in this radical new method.

"For instance, in critical stainless steel weldments, in Type 347 material, in thicknesses from $\frac{1}{4}$ to $1\frac{1}{2}$-inch certain urgently needed weldments required not only X-ray quality welds but absolute freedom from any risk of flux inclusions. The process not only solved the problem but did so on a cost basis, competitive with older processes.

"Similar discoveries about the economy and the usefulness of this process are constantly being made as defense production loosens up the thinking of production men."

J. H. BERRYMAN

manager, process development dept., Air Reduction Sales, New York

Do you need?

SPECIAL WASHERS

—special sizes
—special shapes
—flat
—concentric

If your washer requirements do not come in the commercial sizes, if you have to be fussy as to their flatness, their concentricity or their finish, send us your washer specifications. Since 1932 we have been specializing in filling just such requirements. In addition to our hundreds of stock dies for standard washer production, we are equipped to promptly furnish washers of non-standard sizes requiring, perhaps, closer than commercial tolerances or special physical characteristics.

We fabricate from:

lead
lead alloys
clad bi-metals
brass
bronze
copper
aluminum
block tin
fusible metals
solder
brazing alloys
bearing bronze
clock brass
fibers
plastics
and
special materials

Send us your specification charts of the washers you use—both standard and special. You will find that our prices will be right and that the washers, however special, will be to specifications. Deliveries are prompt, too!

LEAD ALLOY PRODUCTS CO.
9108 ROSELAWN AVENUE
DETROIT 4, MICHIGAN

THIS BIG BITE...
built by
LEWIS!

This massive "bite" is another example of the strength and durability of the large weldments expertly engineered and produced by Lewis. Our specialists have built shovel booms, crane chassis frames, coal gathering heads, lift truck frames, tractor chassis and other equipment for the earthmoving, mining, materials handling and automotive fields. Let them put their skill and experience to work for you. Whenever you need large weldments . . . specify Lewis.

THE LEWIS WELDING & ENGINEERING CORPORATION
Welding Division
1 Interstate Street • Bedford, Ohio

LEWIS

Ne [illegible] ations
[illegible] AL FINISHING . . .

METAL STRIPPER — A

An outstanding development for stripping defective electroplated nickel, copper, silver, cadmium and zinc from steel. Fast action . . . no basis metal attack. The highly polished grill cover illustrated has been completely stripped of nickelplate, and is *ready for replating without repolishing.*

EBONOL BLACKENING PROCESSES

Ebonol finishes are used to beautify a widely diversified list of superior quality products. Photo shows steel parts blackened with Ebonol-S and S-30; copper and brass with Ebonol-C; zinc with Ebonol-Z. U. S. Patents — 2,364,993, 2,460,896, 2,460,898.

EMULSION CLEANER — 75

Oils, greases, buffing compounds, solid particles, deep seated in steel parts are cleaned out and completely removed by this emulsification process. Stubborn, gummy substances on die castings, milling machines, floors, motor blocks emulsify and disperse in water instantly.

ENAMEL STRIPPERS

Enthone has over 20 strippers for removing organic finishes — synthetic enamels, lacquers, vinyls, japans. The best strippers, tailor-made for your particular problem, are selected by laboratory technicians after test runs. This service is rendered free of charge.

Cleaning & Finishing

● SHORTAGES of materials are presenting many perplexing problems for metal finishers but some of the innovations now in use and contemplated undoubtedly will endure for some time to come.

Scarcity of nickel as the conventional undercoating for chromium has led to the increasing use of bright zinc plating protected and brightened by chromate dips and lacquer finishes. Chromium is being applied directly to a buffed copper undercoat and, wher possible, a thin flash of nickel is applied between the copper and the chromium. White brass also is being used as a base.

Considerable work is being done with the metal-like sprayed coatings, as well as instant-drying hot lacquers and porcelain enamels.

Shortage of sulphuric acid has accelerated work on mechanical cleaning, including the wet abrasive method wherein very fine material is used for close tolerance work. As in other phases of metalworking, cleaning and finishing experts are coming up with practical solutions which at first blush might appear to be temporary expediencies.

Mr Gent:

"MANY new sheet galvanizing lines are in operation, with more in the planning stage. Galvanizing shops and die casting plants are being engineered for bigger and better production, which means expansion of present use and new applications promising even wider markets.

"This points to the question of zinc supplies which, for a time, will continue tight but sufficient for all direct defense requirements and a substantial part of civilian needs. For the long term, there are strong indications that the gloomy forecasts which prophesy the imminent exhaustion of zinc supplies have been overdone. Evidence grows that the world zinc reserves will be adequate for the needs in the foreseeable future."

Mr. Babcock:

"POWDER-WASHING was developed to meet the requirements of steel foundries for an improved, flexible method of removing excess and defective material from castings. The process technique is readily acquired by foundry labor in a few hours of training. In most cases powder-washing is so much faster than chipping or grinding that the daily tonnage output per operator is much higher.

"In view of the rapidity with which powder-washing removes sand inclusions and penetrations, some foundries have concentrated their initial usage of the process on these heretofore difficult cleaning operations. Castings that would be uneconomically reclaimed by earlier methods because of the extent of sand penetrations are now being regularly processed through the cleaning rooms, using the powder-washing process. The introduction of the process has also permitted relocation of risers to positions assuring sounder castings.

"The technique incorporates the oscillating movement of gas welding with a high preheat capacity oxygen gouging nozzle and an externally fed jet of iron powder (Oxweld No. 200). The air-borne powder passes through the preheat flames into the large slow-moving oxygen stream which burns away the steel and sand on the surface of the casting. Addition of the burning iron powder particle accelerates ignition of the casting surface, stabilizes the combustion of the casting material, and attacks sand deposits by forming a lower melting point slag."

Dr Osborn:

"NEWEST and what promises to be one of the most spectacular developments in the field of high frequency induction heating is its use for descaling of steel bars and sheets. The first installation is now in operation descaling axle shaft forgings at International Harvester Co. A development is now under way on equipment for descaling strip in conjunction with wire brushing.

"The process fundamentally involves nothing more than heating the surface of a steel part as it passes progressively through a high frequency coil, thereby causing an expansion of the surface which literally explodes off the scale. Not only is the iron oxide which is removed salvageable but the cost of descaling is less than that of tumbling, sand blasting or pickling. In the latter case, the use of this process eliminates the necessity of disposing of the waste pickling solution."

Mr. Kadell:

"IN THE spring of 1951 the tin plate industry embarked on a program aimed at conserving tin by reducing its consumption without, at the same time, reducing tin plate production. It announced its intention, then, of furnishing electrolytically-coated tin plate which carried less tin on one side of the sheet than on the other. Thus, full coating would be applied to the side which formed the inside of the container and must resist corrosive attack by the contents, while a much lighter coating would be applied to the side forming the outside of the container which must ordinarily withstand only atmospheric attack during storage. It also proposed to mark, permanently and distinctly, the light coated side.

"This program marked a radical departure from past practice which called for coating both sides of the sheet of tin plate equally. The

ERNEST V. GENT

executive vice president, American Zinc Institute, New York

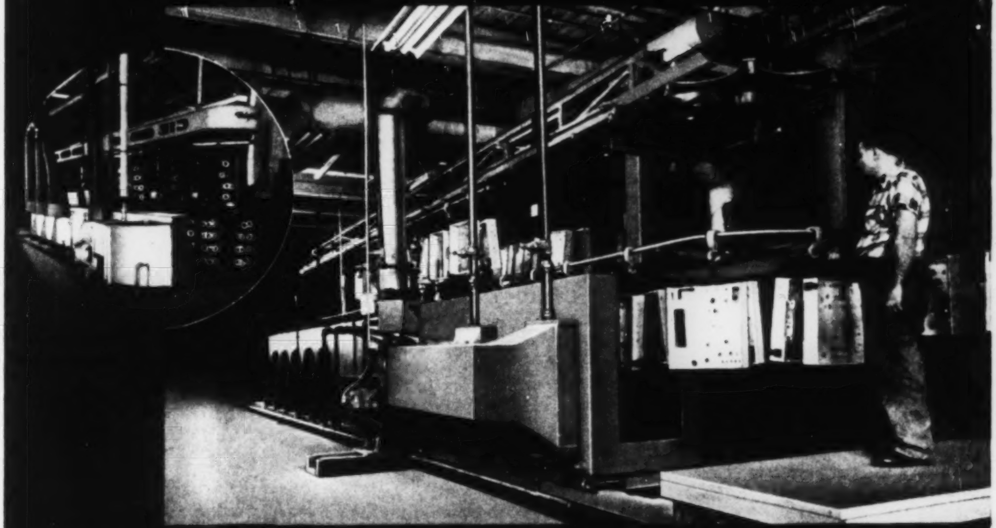
R. S. BABCOCK

development engineer, Linde Air Products Co., New York

HARRY B. OSBORN JR.

technical director, Tocco Division, Ohio Crankshaft Co., Cleveland

Udylite



Whether your plating requirements are geared to strict in-line specialization or job shop diversification, Udylite Full Automatic Plating Machines match today's rigid defense production specifications.

Here, for example, Palumbo Bros. Inc., Commercial Electroplaters of Newark, New Jersey, prove *full automatic* plating production outstandingly efficient and profitable for diversified job shop operations with Udylite Full Automatic and Junior Full Automatic Plating Machines.

Mr. John R. Palumbo, a principal in the firm, writes, *"Our Udylite Automatic Plating Machines truly represent the ultimate in mass production plating. Superior uniform quality is achieved with great savings in man hours, enabling us to enjoy a competitive advantage in job plating. Currently, the majority of parts processed in our zinc and cadmium machines are earmarked for Defense."*

Developing to its present size through aggressive planning, the Palumbo Bros. Inc., has become one of the leading and most modern electroplating establishments in the East. Swift, sure automatic production is the answer!

No matter what your plating problems are, Udylite is prepared to show you how your operation can realize greater production . . . *high volume of high quality at the lowest possible cost* . . . by installing the better way of plating Udylite Full Automatic Machines.

Call in your Udylite Technical Man today or write Udylite direct. No obligation either way.

PIONEER OF A BETTER WAY IN PLATING

THE
Udylite
CORPORATION
DETROIT 11, MICHIGAN

new type of tin plate was made possible by the electrolytic deposition method now in use in the industry. In 1942 it was adopted by all tin plate producers as a means of conserving our meager stocks of tin after Japan had seized and cut off our Asiatic sources of supply of that metal. With the older method (hot dipping) this could not be done in a practical manner.

"Tin plate consumers greeted the announcement of this program with keen interest, and proceeded at once to give it deep study. Orders for this type of plate were, naturally, slow in coming in at first, since the users had to set up programs for adapting themselves to it. From month to month, however, the buying has increased rapidly. The coming year will undoubtedly witness a very strong general trend towards the use of 'differential coatings' in tin plate."

Mr. Hogenson:

"LAST YEAR the porcelain enamel industry was faced with a challenge to its ingenuity with respect to raw material supplies. As a result of the national defense program, the Government restricted the supply of critical materials for use in consumer production to channel them into defense production. A typical example is cobalt, which is highly essential to the manufacture of porcelain enamel ground coats and is also essential in the electronic and aircraft engine fields.

"This diversion of cobalt to defense production imposes a distinct challenge to the research and development efforts of the frit industry which, necessarily, has had to reformulate ground coat frits utilizing less cobalt as well as other critical materials and, at the same time, provide commercial users with frits which would perform in a manner comparable to the former high metal content ground coats.

"The challenge has been met. Despite the restrictive orders, we have been able to accomplish this reformulation and provide the porcelain enamel industry with frits of exceptionally high quality."

A. E. KADELL

manager, tin plate dept., Weirton Steel Co., Weirton, W. Va.

Mr. Diggin:

"METAL FINISHERS have had to shift their processing methods because of restrictions on the procurement and use of nickel, cadmium, copper, tin and other metals commonly used. Metallic salts and other chemicals needed in electroplating operations have been and continue to be difficult to obtain.

"Many articles, which just a year ago were finished with conventional nickel-chromium plate are now being bright zinc-plated, further brightened and passivated in one of the several chromate dips, and, to hold the bright finish given, a coating of clear organic enamel. Because of the high price and allocations, cadmium has almost passed out of the picture for these applications on civilian goods. Examples of articles zinc plated as a substitute for nickel-chromium are wrenches, refrigerator shelves, hardware items and low cost automobile accessories.

"Where chromium plating is desired as the final finish for high tarnish resistance, color and hardness, the plating industry has been hard-hit by restrictions on the use of nickel, the usual undercoating for chromium. For applications where nickel is not permitted, chromium is being applied directly to the bright plated or buffed copper undercoating. Chromium does not throw well into deep recesses or around holes and as a result, the reddish copper shows through.

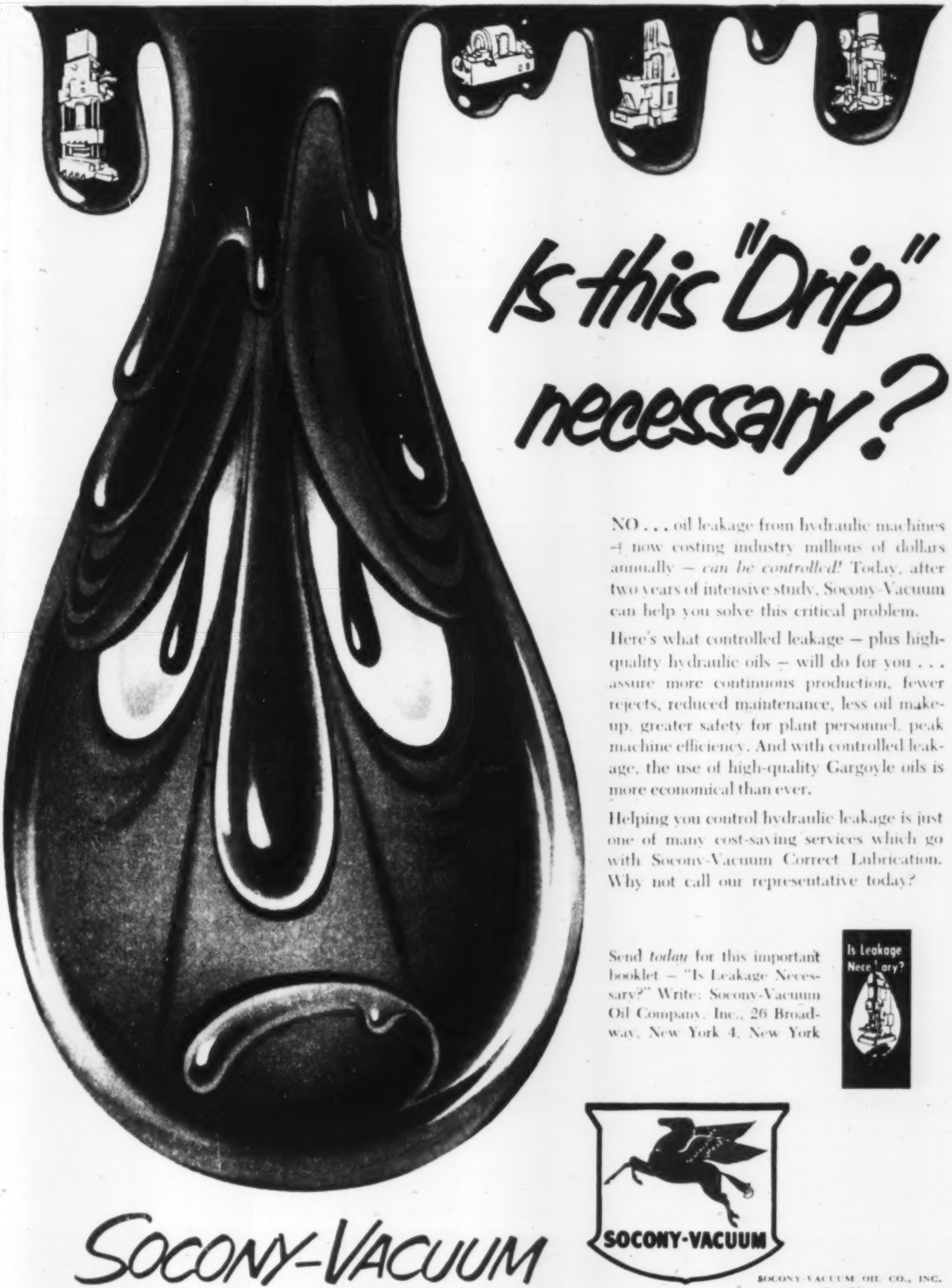
"Wherever possible, existing supplies of nickel are being used up in applying a thin nickel flash over the copper to minimize this difficulty. Also, because chromium does not stand up as well when applied over copper in contrast with a nickel coating, many parts, especially those subjected to outdoor exposure, are given one or two coats of a clear synthetic lacquer. The consumer of goods processed in this manner is being given special instructions for maintenance.

"For those compelled to substitute copper for nickel, it is fortunate that several bright plating acid and cyanide type baths are available. The use of periodic reverse current with copper solutions has also advanced to the point where deposits produced by this method are bright, as protective as an equivalent thickness of nickel, can be applied rapidly and have a remarkable degree of leveling, thus decreasing the amount of polishing and buffing required for an acceptable finish.

"At the beginning of the year, tin-zinc alloy baths were being installed to produce substitute finishes but tin-metal allocations were suddenly withheld for this purpose. Lately there has been a considerable interest in the so-called 'white brass' deposits as an undercoating for chromium. The deposit is an alloy of 80 per cent zinc and 20 per cent copper, and can be plated bright. The deposit is brittle when heavy coatings are applied, and the process has other limitations. However, it is used to a limited extent in preference to all-zinc deposits because the latter are difficult to

E. HOGENSON

executive V.P., Chicago Vitreous Enamel Product Co., Cicero, Ill.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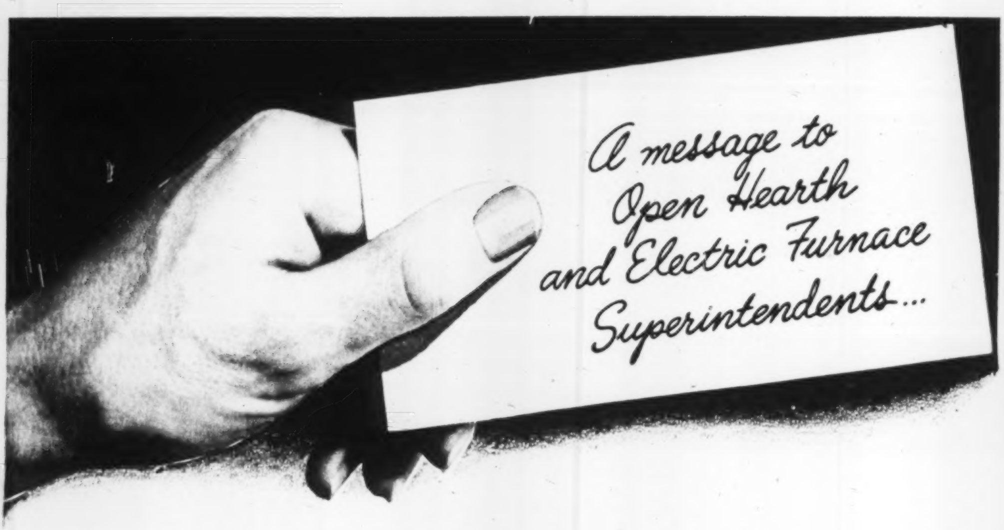

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bright chromium plate.

"Electrolytic iron deposits have been substituted for copper and nickel in electroforming. Many manufacturers of phonograph records are now making the stampers from electrolytic iron with results equal to best nickel stampers.

"In the light metal field, defense needs have increased the volume of anodizing of aluminum by both the chromic acid and sulphuric acid processes. Many aircraft plants have started to chromic acid anodize certain parts with a short five-minute treatment.

"In the field of chemical dips for producing a protective film on aluminum surfaces, a number of relatively new processes are available, the latest being a five-minute spray treatment. This reduces the processing time considerably in contrast with the customary 20 minute immersion dip process."

Mr. Mitchell:

"USE of black oxide finishes has increased the saleability of items which required an economical attractive finish and has saved industry thousands of dollars because of the replacement of other more expensive type finishes with black oxide. One major improvement within the last year has produced a black oxide formula which will speed the blackening cycle, blackening in one solution certain hard-to-blacken, heat-treated parts (in particular nitrided and carbonitrided), operating at a lower

MYRON B. DIGGIN

technical director, Hanson-Van Winkle-Munning Co., Matawan, N. J.

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GERRARD ROUND STRAPPING complies fully with the joint Army-Navy specifications JAN-P-106A, JAN-P-107, and JAN-P-108 for overseas packing. That means it is strong enough to do a good job.

It has other advantages besides strength, however. Because it is round, it is ideal for palletizing either regular or odd-shaped units, and it can be applied as a Diagonal Tie to give secure reinforcement to all six sides of a box or carton.

Why not consult a Gerrard engineer about your defense strapping problems? He may be able to suggest a method of strapping that will help get more use out of your available strapping. Strapping ordered for defense receives preferences in delivery according to current regulations. Strapping available for non-defense orders is being equitably distributed among our customers.

HIGH EXPLOSIVE
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Two 16 ga. round steel straps close and reinforce this carton of powder. This method of closure permits cartons to be reused many times. Gerrard Model TI machine is mounted on suspension arm.

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Now . . . you can prevent congestion in the mill . . . free more mill space for production operations . . . eliminate costly re-handling . . . save time and money in getting out current orders!

How? With Ross Series 100 . . . the *only* Carriers designed and built all the way through for rough, tough steel mill service . . . the *only* Carriers with that great reserve strength steel men demand. Self-loading and unloading, Ross Series 100 requires only a driver . . . and moves capacity loads at speeds up to 33 mph.

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temperature and self-rectifying. This self-rectification counteracts the deleterious effects of the possible build-up of colloidal red iron oxide and contamination by zinc, copper, cadmium, aluminum, etc., which may inadvertently be introduced into the blackening solution.

"Because of these many improvements, black oxide finishes are not only being applied in thousands of regular still line equipment installations, but in large, fully automatic ones which produce in some cases as much as 100,000 to 200,000 parts per day."

Mr. Cline:

"ABRASIVE blast cleaning will serve new ranges of applications as a result of recent developments in the field of wet blasting. Although abrasive blasting with dry metallic shot or grit has long been used for general cleaning and finishing operations, it has been recognized that for certain precision-built work a less severe means of cleaning or finishing was needed. Severity of abrasion can be minimized if abrasives of very fine mesh are employed.

"This disadvantage is overcome with wet blasting so we can now expect important economies to be effected in the cleaning and finishing of such close-tolerance work as plastic molds, forging dies, aircraft parts, machine tools, and other parts characterized by sharp lines, edges, or thin-walled sections that must neither be destroyed nor

A. J. MITCHELL
president, Mitchell-Bradford Chemical Co., Stratford, Conn.

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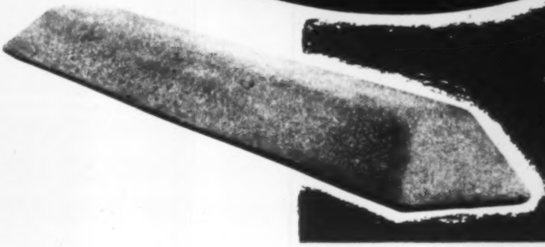
PIG IRON

Making MELTRITE
Beginning of a cast
of molten iron.



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altered. Tolerances in the range of 0.0001-inch can easily be maintained in the process.

"Most significant development in wet blast equipment is probably the introduction of vertical pumps for slurry movement. These new pumps eliminate certain troubles that have been experienced in the past with horizontal-type pumps. These include freezing of the impeller due to abrasive settling out of suspension and caking when the machine is shut down and a considerable loss of slurry from packing gland leakage.

"Many different types of abrasive have been developed to make the process perfectly adaptable to a wide range of work. All sizes can be obtained directly from stock."

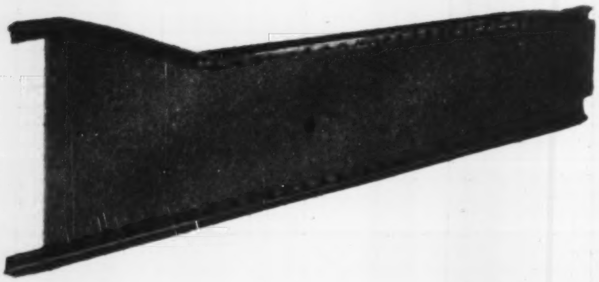
Mr. Sanderson:

"METAL shortages have only just begun. Increasing military and defense demands in 1952 are going to require metal fabricators to streamline all production phases—to engage more actively in the salvage of tools and parts normally destined for the scrap heap—to take steps to increase the life of valuable tools.

"We have made many advances in the field of metal-finishing that will help metal fabricators realize these goals. For example, a manufacturer of Diesel nozzle holders had a 50 per cent inspection rejection because of burrs kicked up during manufacture. After instal-

C. R. CLINE

ass't. to president, American Wheelabrator & Equipment Corp., Mishawaka, Ind.

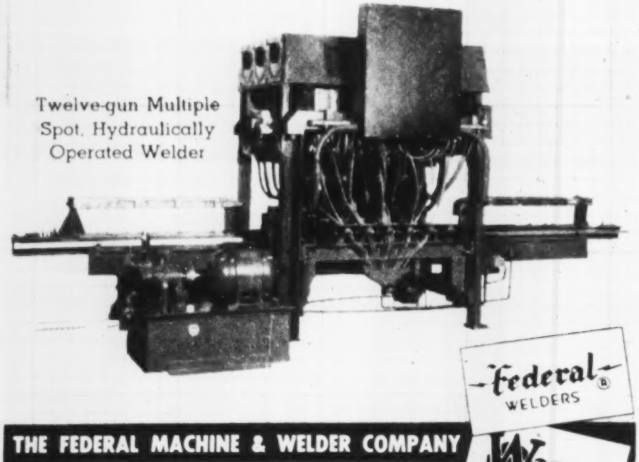


15,000 WELDS per HOUR

FEDERAL WELDER INCREASES PRODUCTION, CUTS COSTS ON NEW DESIGN AUTOMOTIVE FRAME CROSS MEMBER . .

It's happened again! A leading manufacturer has redesigned a product to receive the benefits of resistance welding. An automotive frame builder redesigned the cross members and asked Federal to build a machine that would weld the sections together.

Federal engineers designed and built two twelve-gun multiple spot, hydraulically operated welders that delivered 190 finished pieces per hour, doubling production and cutting costs by more than 25 percent. The welders are compact, releasing valuable floor space, with open framework that provides easy maintenance. The six 150 KVA transformers are arranged for three-phase distribution to equalize power demands. Equipped with shuttle type fixtures, the machines are constantly working . . . no down time while loading. These and many other features are reasons why this fabricator, like hundreds of others, has turned to resistance welding and Federal Welders for high speed, low cost and uniform quality production.



Twelve-gun Multiple Spot, Hydraulically Operated Welder

Federal® WELDERS

THE FEDERAL MACHINE & WELDER COMPANY
WARREN, OHIO

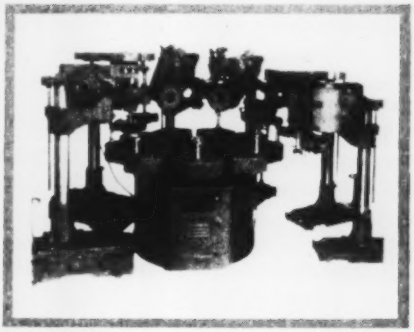
Warco PRESSES ®

Handsome job

HERE THE REWARD is personal satisfaction, but in metal working the payoff must be high production, especially in these times. That's why you can't afford slow, costly hand finishing when you can buff, grind, or deburr far faster and more efficiently with Packer-Matic machines . . . and with Packer-Matics you increase uniformity, save floor space, and cut labor cost — one unskilled operator replaces many skilled finishers. If you consider your volume too low or your products too varied for completely automatic equipment, let us run a test on your product in our plant, without obligation.

Your factory-trained Packer representative can give you complete information about continuous, indexing, or straight-line Packer-Matics . . . about the many unique features of Packer machines, designed to meet specific requirements, built to keep meeting them through years of continuous service.

Your Packer-Matic is thoroughly tested before it leaves our plant, and fully guaranteed for one year. Investigate Packer-Matic finishing today: write to the Packer Machine Company, 250 Center Street, Meriden, Connecticut.



No. 14-9 Rotary Indexing, equipped with work spindle oscillating units.

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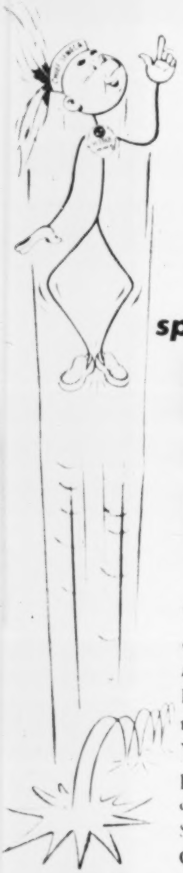

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lation of wet-blasting equipment, the deburring was done efficiently, and the rejection rate dropped to

"Further advances being made by us are the direct hard-chrome plating of magnesium and titanium in our research and development laboratory; we hope to offer results to industry in the near fu-

"Another factor to be taken into consideration in 1952 is that more efficient production methods and economy of tools not only will aid the defense effort, but will help the balance ledger in this era of profitless prosperity."

W. A. SANDERSON, Cro-Plate Co. Inc., Hartford, Conn.

Mr. Nelson:

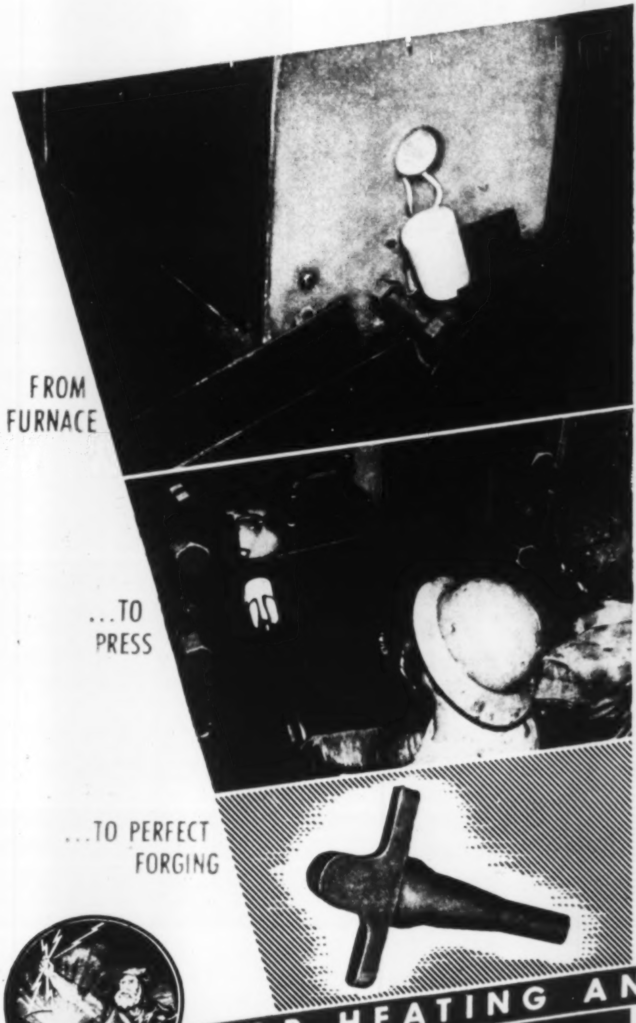
"NEW materials and processes to alleviate critical materials were developed last year by the porcelain enamel industry. The shortage of cobalt was especially critical since all porcelain enamel ground coats use cobalt to develop adherence to the base metal; however, the industry found that the use of small amounts of antimony oxide would allow a reduction in cobalt content without affecting adherence.

"Spray equipment companies, in conjunction with the porcelain enamel industry, developed low pressure spraying equipment and techniques. This permitted the spray gun to be held closer to the work and reduced enamel overspray losses by 30 per cent. Smoother surface textures and

F. W. NELSON
management engineer, A. O. Smith Corp., Milwaukee

Saves ten tons of steel a day–

WITH AJAX-NORTHRUP INDUCTION HEAT



Improved forging methods, using Ajax-Northrup induction heat, have reduced billet weights for these axle spindle forgings from 7½ to 5¼ pounds. Resultant steel savings add up to *ten tons* of SAE 5132 bar stock a day!

Up to 720 scale-free billets per hour are fed directly from an Ajax-Northrup heater to 1750-ton Maxipress extrusion presses. Forgings are formed in one operation, saving time and labor, and reducing floor-space and equipment requirements.

Ajax-Northrup heat saves up to 20% of original billet weight. First, by elimination of scale, and second, by accurately controlled, even, penetrating heat which permits forging to extremely close tolerances . . . 2 ounces for an 8-lb. connecting rod, to quote another example.

Better heat means better fiber flow, too. As a result, fatigue resistance of the axle spindles is reported to be 17.3% better than that of conventionally heated, hammered forgings.

Ajax-Northrup can save steel, time, and labor in your plant, too. Write us today . . . call on our 35 years of induction heating and melting experience.

SEND FOR NEW INDUCTION HEATING AND MELTING BULLETIN

136

FOR HEATING AND MELTING

AJAX NORTHRUP

AJAX ELECTROTHERMIC CORPORATION

AJAX PARK
TRENTON 5, NEW JERSEY

AJAX

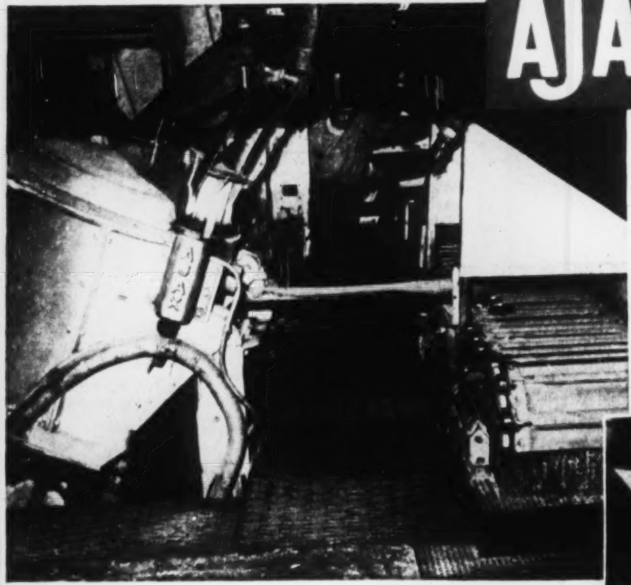
Associate Companies

AJAX ELECTRO METALLURGICAL CORP.
AJAX ELECTRIC FURNACE CORPORATION
AJAX ELECTRIC COMPANY, INC.
AJAX ENGINEERING CORPORATION

MILLIONS of POUNDS

of Aluminum per year reclaimed with the help of

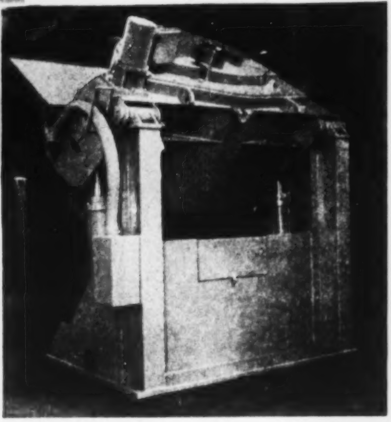
AJAX INDUCTION FURNACES



166 kW AJAX Induction Furnace in tilted position, pouring molten aluminum alloy through a coated trough into ingot molds on conveyor

MAJOR AUTO MANUFACTURER RECOVERS SCRAP FROM MACHINING OPERATION BY MODERN MELTING PROCESS

Here is an interesting setup for reclaiming aluminum alloy chips, which is installed adjacent to the piston casting setup in one of the largest automobile manufacturing plants in the country. More than half of the aluminum needed for pistons in this plant comes from this scrap recovery program. A considerable net profit is realized, and aluminum purchases are lowered.



Above is a 330 kW furnace. AJAX Engineering Corporation manufactures low frequency electric induction furnaces in a great variety of sizes ranging from 20 to 1000 kW. This type of equipment has been adapted to the full range of non-ferrous metals and alloys.

Send for Reprint of Article on Scrap Recovery by Induction Furnaces

AJAX

TAMA-WYATT

AJAX ENGINEERING CORP., TRENTON 7, N. J.

INDUCTION MELTING FURNACE

AJAX ELECTRO METALLURGICAL CORP., and Associated Companies
AJAX ELECTROTHERMIC CORP., Ajax Northrup High Frequency Induction Furnaces
AJAX ELECTRIC CO., INC., The Ajax-Hultgren Electric Salt Bath Furnace
AJAX ELECTRIC FURNACE CORP., Ajax-Wyatt Induction Furnaces for Melting

more uniform application were also possible with the lower spraying pressures.

"A commercial de-enameling plant, using a 300°F caustic soda solution, was set up to salvage defective ware for the industry. This plant is returning many tons of steel to production that would otherwise be delegated to the scrap pile.

"Refractory ceramic coatings have proved successful in installations where high temperature resistance characteristics are required. Use of these ceramic coatings has permitted the utilization of lower alloy steels in many instances.

"Ultimate goal of the industry has been in the direction of developing a process whereby one coat of white enamel could be applied directly to the steel. Heretofore, it has been necessary to apply a base coat of blue (cobalt) ground coat to obtain good adherence to the base metal. Last year a process was developed whereby a 0.005-inch coat of high opacity white acid-resisting enamel could be applied directly to flat steel shapes. The thin coating permitted deformation of the base metal without excessive failure of the porcelain enamel. This process is in the pilot plant stage."

Mr. Loengard:

"1951 was a year in which experimentation with various methods and materials for providing dur-

R. O. LOENGARD
president, United Chromium Inc., New York

NEW
THE ONLY PLANT IN EASTERN U. S.
EQUIPPED FOR STEEL PICKLING
COILS UP TO 48" WIDE

PICKLING coils:
1" to 48", 10 to 20 gauge
100 to 10,000 lbs.
SHEETS & PLATE: Any width, any length, any thickness.
CAPACITY: 25,000 tons/month.

Prompt Quality Service
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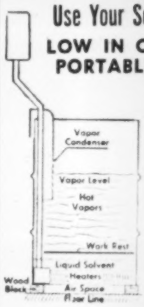
MOST REVOLUTIONARY DEGREASER DEVELOPED!
BAR-L* Vapor DEGREASER

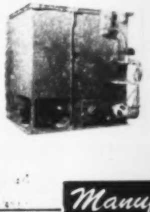
Use Your Solvent Drum for a Tank!
LOW IN COST—ECONOMICAL
PORTABLE AND PRACTICAL



HOW A DEGREASER WORKS
Trichlorethylene solvent is heated to a boiling point in the lower section of the drum. Vapors condense on work and wash off oil, grease and dirt. Most parts can be cleaned in less than 60 seconds. Solvent vapors are kept *inside the drum* by a scientifically-designed condenser which returns the solvent to the boiling chamber. REMEMBER: Anything that can fit into a solvent drum can be cleaned in a BAR-L Degreaser! And it's priced right!

WRITE FOR COMPLETE DETAILS

*Patent Pending



SEE OTHER "MP" VAPOR DEGREASERS
Standard or conveyorized—available in all sizes, shapes and capacities to suit your specific needs. Originators of "VIBRA-DEGREASERS" with spiral vibrating conveyor. Write for complete details.

Manufacturers Processing Co.
METAL CLEANING CHEMICALS AND EQUIPMENT
1360 HILTON ROAD DETROIT 20, MICHIGAN

LET'S TAKE ANOTHER LOOK AT SHIMS

"laminated shims cut our assembly time 10-20%"
—pump manufacturer

"reduced our gear mesh and end play problem"
—aircraft manufacturer

"gave us .002" accuracy with .063" tolerance"
—machine tool manufacturer

"shims are cutting our machine shop expense"
—diesel manufacturer

SHIMS ARE GOOD ENGINEERING. They cut costs without sacrificing the quality of your product. Surely, this is the acid test of a machinery component. And here is how shims achieve the results:

REDUCED MACHINING COSTS: With the use of shims as spacers in appropriate situations, your machinery tolerances can be more flexible. Accurate shimming can achieve the final adjustment required. No standby lathe is required during assembly operations.

REDUCED ASSEMBLY TIME: Final fitting can be achieved right at the job. Parts do not need to be assembled, then disassembled and removed for further machining, grinding or filing of a few thousandths. Shims will make the adjustment immediately and easily.

REDUCED LABOR COST: Obviously, reduction of machining or assembly time reflects in lowered costs. But in addition, assembly with shims is a less skilled operation than assembly involving intermittent machining operations. No new skill is needed.

AN ADDED SERVICE FEATURE: The use of shims, particularly our own LAMINUM shims, gives you an added service feature. When parts are worn by use, the simple removal of a shim lamination can restore clearance to original requirements. Here is an exclusive feature for take-up of wear during the entire life of the machine.

Split bearing adjustment. Lathe head stock spindle bearing.

Bevel gear mesh adjustment for agricultural machinery.

Babbitted shim in bearing adjustment. Internal combustion engine.

LAMINUM

THE SOLID SHIM THAT *peels* FOR ADJUSTMENT

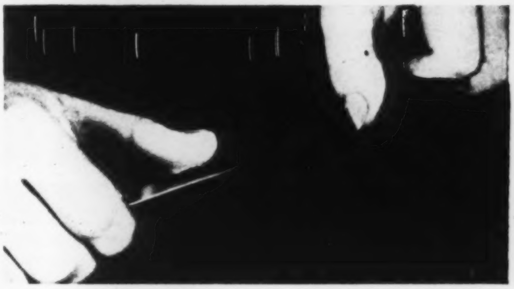
SHIM ENGINEERING DATA FILE

[illegible]
specifications on shim materials.

4 GENERAL TYPES OF SHIMS ARE AVAILABLE

LAMINUM® SHIMS—simply peel for adjustment

Laminated shims actually peel off in .002 or .003 inch layers, providing a simple, but very accurate adjustment in spacing. The laminations peel easily with a penknife, yet the shims are in a solid unit, bonded over their entire surfaces. There's no counting, stacking or miking, as with loose leaf, separate shims. Gauge is always known. No grit can lodge between layers. The LAMINUM shim is actually less compressible than solid metal.



Laminated shims are stamped from brass or steel LAMINUM, the "metal that peels." They're made up of layers of .002 or .003 inch brass or steel, metallically bonded together over their entire surfaces.

Herringbone gear mesh and thrust bearing adjustments. Rotary pump.

Tapered roller bearing adjustment. Oil well drilling equipment.

Gear and magneto mounting adjustment. Aviation engine.

SPOT-SOLDERED SHIMS

Shim packs can also be provided, made up of any prescribed number of laminations with edges tack-soldered (brass only). This method of grouping laminations has some disadvantages, but meets with occasional acceptance by some designers and production men for special applications.

LOOSE LEAF SHIMS

Loose leaf shims, of course, require counting and stacking but have the occasionally important advantage of allowing a variety of shim thicknesses. No significant economy is effected because, unlike the LAMINUM shim pack each leaf is stamped as a separate unit.

SPECIAL SHIMS FOR SPECIAL PROBLEMS

For special applications, we have devised other patented methods of joining laminations together for use in packs, particularly when the purchaser has been interested in the split second use required for high speed production.

We have made untold millions of shims in our 38 years devoted to this work. This experience might well provide an easy solution to your shim engineering problem.

The solving of your very knottiest shim problem is work that we solicit most eagerly, without obligation to you. Such assignments best further our own knowledge of shim engineering for our mutual benefit. And, inasmuch as we manufacture all types of shims, we feel well qualified to recommend impartially to you.

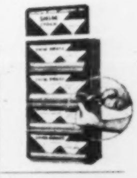
SHIM STOCK packaged for instant use without fumbling or waste.

Available from your Industrial Distributor, only.

RUGGED CARTON DISPENSERS

STURDY FLAT PACKETS

THE 4-GAUGE ECONOMY CARTON



THE METAL DISPENSING RACK

[illegible]

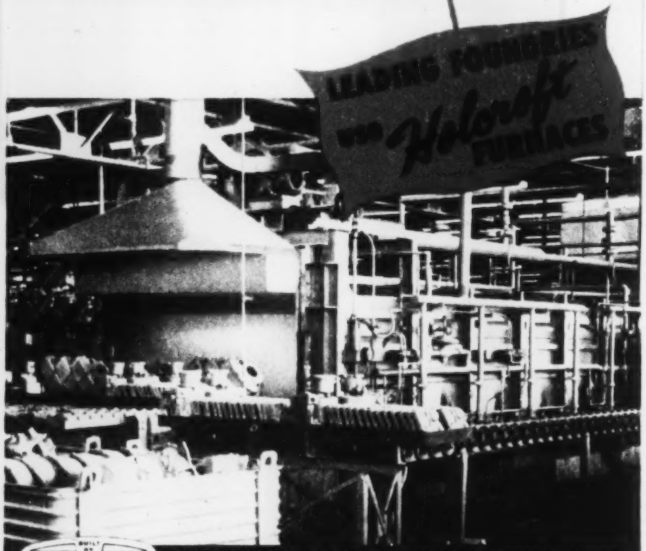
for PRODUCTION ANNEALING
of CASTINGS LIKE THESE

This compact Holcroft furnace anneals, descales and desands castings at a production rate of 10,000 lbs. per hour.

Not only that, but it delivers the castings at a lower cost per piece.

Foundries all over the country depend upon Holcroft to give them the furnace help they need. That's because Holcroft is such a well-known leader in the field. Many foundry practices, standard procedure today, were basic ideas worked out by Holcroft engineers.

You, too, can take advantage of this furnace know-how. Write today for complete information. **Holcroft and Company, 6545 Epworth Blvd., Detroit 10, Michigan.**



PRODUCTION HEAT TREAT FURNACES FOR EVERY PURPOSE

CHICAGO 9	CLEVELAND 15	HOUSTON 1	CANADA	EUROPE
C. H. Martin, A. A. Engelhardt	Wallace F. Schott	R. E. McArdle	Walker Metal Products, Ltd.	S. O. F. I. M.
4209 South Western Blvd.	1900 Euclid Ave.	5724 Navigation Blvd.	Windsor, Ontario	Paris 8, France

able and corrosion resistant coatings in the face of serious limitations on the use of certain particular metals has continued and has been the basis for extensive and varied tests. The coming year will undoubtedly see a continuation of this trend.

"It would be surprising if the net result were not to bring forward new combinations of materials, new processes and new points of view with respect to the whole problem of metal coating and finishing.

"Because of the great incentive to inventive genius and because of the urgent need for effective production, there will be a tendency to take nothing for granted. There will be a fuller evaluation of processes, both old and new."

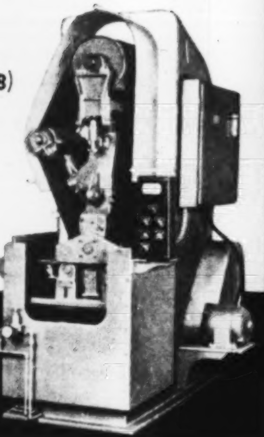
Mr. Imhoff:

"SEARCH for better operating conditions in galvanizing shops leads toward carrying the fumes down and out through acid-proof ducts from the tanks. The spent acids are also drained out in acid-proof piping and sewers, and carried to a special treating sump. Here they are neutralized and made harmless by nonprecipitating chemicals which puts them in condition to be run in the sanitary sewer system.

"With the many new resins and coatings now available the question of tank protection has also been studied. The acid-proof brick tank, floors, sewers etc., while

WALLACE G. IMHOFF

president, Wallace G. Imhoff Co.
Encino, Calif.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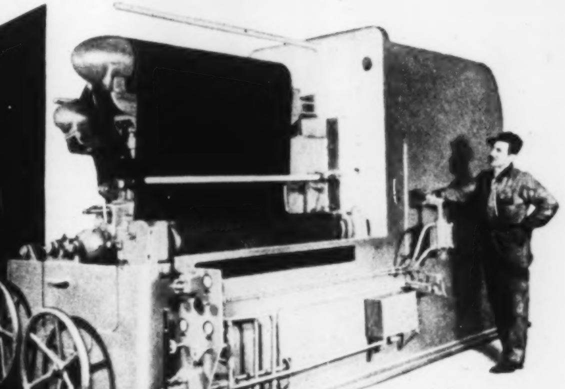
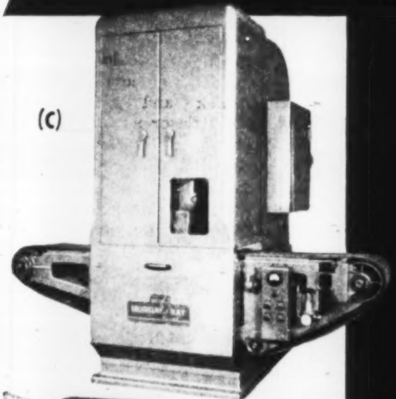

(A)

IF THE STOCK IS FLAT

MICRO-POLISH


(C)

can automatically finish your job faster, better or cheaper regardless of size, shape or material.

Murray-Way, "engineered-to-the-job", Micro-Polish equipment is now being used the country over in every type of application, on every conceivable kind of material.

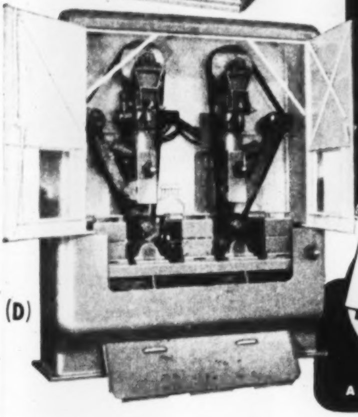
Micro-Polish is an amazingly versatile and consistently successful automatic polishing method useful on any job from the prepolishing of low grade steel sheet, to meet high quality job specifications, to the production sharpening and polishing of pruning tools.

Micro-Polish can precision finish any size, shape or length of sheet, strip or blanked stock in ferrous or non-ferrous metals, wood, fiber, plastic, rubber or leather, by wet or dry process.

The typical Micro-Polish equipment shown here demonstrates how Murray-Way engineers have adapted the process to individual job requirements.

- **A** A Micro-Polish giant used in reclamation grinding of steel strip.
- **B** One of our smaller units used in polishing narrow bi-metal stock.
- **C** A versatile unit using belt conveyor to polish a variety of flat stampings and forgings.
- **D** A space saver unit for polishing flat bar stock. Two heads and two grades of belt grain accomplish the complete job without rehandling.

Murray-Way engineers will gladly show you how this time and cost saving method can improve your polishing operation.


(D)

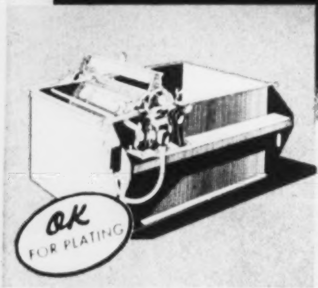
MURRAY WAY

THE MURRAY-WAY CORPORATION

POST OFFICE BOX 180 — BIRMINGHAM, MICHIGAN

AUTOMATIC POLISHING, BUFFING, GRINDING EQUIPMENT

DETREX 61
for
Tough Cleaning Jobs



DETREX
61
OK
FOR SOAK
TANKS

Electroplaters like Detrex 61 for cleaning prior to barrel plating because of its high wetting and penetrating powers and because it is free rinsing.

Maintenance men prefer Detrex 61, the ideal heavy-duty cleaner, for the removal of stubborn road dirt, oil and grease from motor blocks, etc.

Yes, you'll find Detrex 61 a versatile alkaline cleaner—perfect for soak tank use, and for cleaning before barrel plating, prior to phosphate coating, and before vitreous enameling. It quickly removes oil and grease from all ferrous parts.

In one plant, for example, cleaning costs have been cut in half, because "61" costs less and is used at lower concentration. But even more important, a better cleaning job is obtained.

You, too, can cash in by using a Detrex compound fitted to your job. Write today.

112 A

DETREX Corporation
BOX 501, DETROIT 32, MICH.

more costly to install as a first cost, in the life and service given is one of low cost in the end. Mechanical abuse, repair and maintenance, and many other factors must be taken into consideration when selecting tanks.

"The old question of pot failure is still a live one with the latest development being the thin-lined attached refractory lining that is not attacked by molten zinc.

"An important factor of metal cost is weight of coating, or 'zinc pick-up'. The writer has called attention many times that the quality of the zinc purchased, especially from the standpoint of lead content, is a most important factor in the amount of zinc used per ton of product. It has also been pointed out in the study of dross production, that the quality of zinc purchased is a vital factor."

Mr. Lewis:

"FOR MANY years acid has been used for removing scale from rod and wire. The process has been cheap, quick and satisfactory. There was little or no incentive to make a change. However, in recent years the following factors have combined to make mechanical cleaning appear attractive.

"In 1950 a shortage of sulphuric acid was experienced which fortunately eased off somewhat in 1951. There is increasing pressure to eliminate stream pollution by acid wastes. Such disposal equipment is expensive to build and operate. The tungsten carbide die is

D. LEWIS

chief engineer, dev. engrg., John A. Roebling's Sons Co., Trenton, N. J.

BULLARD

MANUFACTURERS OF MACHINE TOOLS

Thomas Lake and Mine near Red Mountain Pass in San Juan Mountains, Colorado

Kaufman & Fabry Photo

The Invisible Background of Industrial Progress

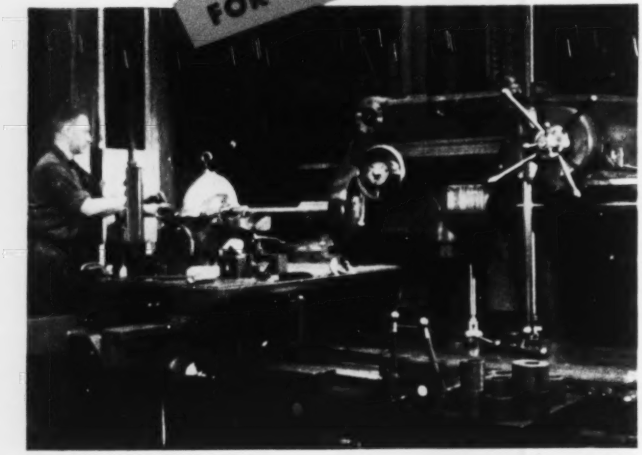
In this illustration is depicted a mining operation typical of many which produce basic materials from the resources of our land. While such operations are unknown to many, it is significant that they occupy a prominent and important position in our general economy and American way of life. Basic materials, when refined, take the form of finished products common to the eyes of the average American. Free Government, free enterprise and American ingenuity, have made it possible to develop such operations for the benefit of the world at large. Without the use of *Modern ★Machine Tools* which play an important part in the processing of the basic material from the mine to the end of the assembly line, the average American would have few of the many items common to his mode of living. Modern equipment has made possible product cost reduction, bringing within the means of the average American, his own home, automobile, refrigerator, television, clothing and food. We are proud of the small part in this American scheme of things which we have been privileged to contribute.

★ For greater manufacturing economy REFER to next page

THE BULLARD COMPANY
BRIDGEPORT 2
CONNECTICUT

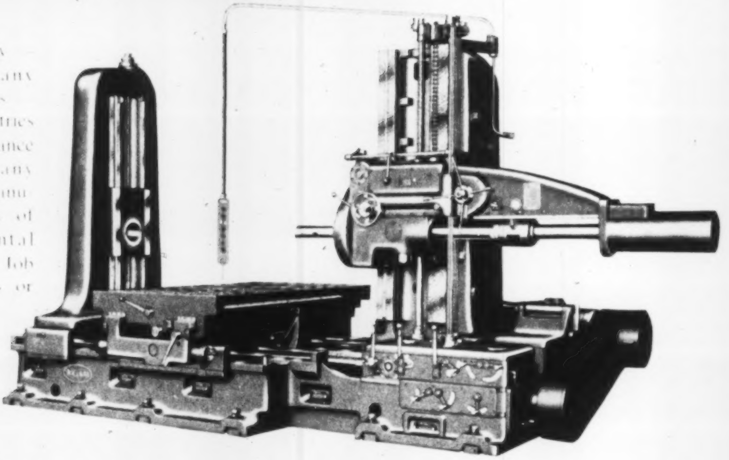
BULLARD MACHINE TOOLS

FOR GREATER MANUFACTURING ECONOMY



World Economies require higher Standards of Manufacturing today than ever before. Whether it is Maintenance Work or Precision Production, Bullard Machine Tools are built to meet your requirements.

Whatever the industry — mining with its many phases and suppliers — capital goods industries — the home appliance industries and many others, know the Manufacturing Economy of Bullard Horizontal Boring Mills for the Job Shops, Tool Rooms or Production Lines.



BULLARD

Write for complete information on 4" and 5" Spindle size Bullard Horizontal Boring, Milling and Drilling Machines.

THE BULLARD COMPANY

BRIDGEPORT 2, CONNECTICUT

so much better than its chilled cast iron or alloy steel predecessor that it can stand a little scale without cutting out. Modern wire drawing lubricants which enable mills to draw wire without a lime coating.

"In Europe the acid shortage has been and is much more severe than here. Under this stimulation a descaling machine for rod was developed by Etablessements Victor Line at Albert (Somme) and used by Societe Metallurgique de Gorcy, Paris, who are manufacturers of low carbon wire. These machines are placed in tandem with the wire drawing machines. This company has been able to do away with its cleaning house. Many other wire plants in England and on the Continent are experimenting with varying success both with these machines and with machines of their own design.

"In this country several manufacturers are successfully using mechanical descaling. Present indications are that mechanical descaling will take its place in wire production and displace acid cleaning on some products."

Mr. Carpenter:

"HIGH safety factor required in aircraft steels plus the reduction of alloy content has made necessary a faster quenching speed to attain hardness and yield strength set forth in USA specification MIL-H-6875. For aircraft pistons and certain other parts employing 4300 and 4100 steels, with high mini-

A. E. CARPENTER
chairman of the board, E. F. Houghton & Co., Philadelphia

There's an idea here for you!

How to get more mileage out of your packaging!

To keep hungry automotive assembly lines well fed with component parts, 90 Holly carburetors are nested for shipment in this sturdy H & D Palletpak. Two of these corrugated units, each with a loaded weight of 1000 pounds, are strapped to a pallet for convenient handling with power equipment. Thus, 180 carburetors are safely and economically shipped as one unit.

Light-in-weight corrugated shipping boxes with plenty of strength to spare are H & D specialties. For the full story, plus tips on how to lower your packaging and shipping costs, write for free booklet "How To Ship Heavy Products In Corrugated Boxes." Hinde & Dauch, 5217 Decatur Street, Sandusky, Ohio.

H&D®

HINDE & DAUCH

Authority on Packaging

Akron, Baltimore, Battle Creek, Mich., Bloomington, Ill., Buffalo, Chicago, Cincinnati, Cleveland, Columbus, Denver, Detroit, Fairfield, Conn., Findlay, Ohio, Gloucester City, N. J., Greensboro, N. C., Hoboken, Indianapolis, Jamestown, N. Y., Kansas City, Lenoir, N. C., Minneapolis, Omaha, Plymouth, Ind., Reading, Pa., Richmond, Va., Roanoke, Va., Rochester, Sandusky, Ohio, Shrewsbury, Mass., St. Louis, Toledo, Watertown, Mass.

Boost Cold Finished Bar & Tube Output!

with MEDART

COLD FINISHING MACHINES

Medart Equipment can fulfill today's urgent demand for ***more and faster production!*** Used in virtually every steel and non-ferrous mill in the country, Medart Machines have **proved** they can keep costs down — give closer control over quality — and show remarkable increases in output, in some cases almost double or triple! ***Investigate!***

SHAPE STRAIGHTENER — Model TPVC

For large production at extremely high speeds. Handles squares, flats, octagons, hexagons in 2 planes without roll changes.

CENTERLESS BAR TURNER

Doubles grinding department production. Patented "torque chipping" feature and push draw feed turns bars small as ¼" at very high speeds.

BILLET PEELERS

A complete line handles ferrous or non ferrous billets 1" to 14" in diameter at up to 40 ft. per minute.

STRAIGHTENING, SIZING, POLISHING MACHINES

Equipment to meet every need for precision top speed production on round bars, tubing and pipe. "Medart Finish" has become the standard of the industry.

Write FOR CATALOGS

Straightening, Turning, Polishing, Sizing Machines—Bar And Billet Peelers—Centering Machines—Tube Derodders—Bar Pointing Machines, etc.

THE MEDART COMPANY 3535 DE KALB STREET
ST. LOUIS 18, MISSOURI

mums established for hardness, this faster oil has proved of great aid.

"In the heat treatment of such steels shallow hardness is not permitted. Steels on the low side of the hardenability range have been found to require this faster quench.

"For cleaning after heat treatment, a surface active agent (synthetic detergent) in our Cerfak series is meeting with wide approval because of its efficiency and easy handling in production. The uses of surface active agents in making water 'wetter' are only just being revealed as platers and pickling departments increasingly turn to such chemicals to speed up processing time.

"In the field of machining, a new water-soluble cutting base has made big strides during the past year. This is a different type of cutting base, being fortified with sulphur for antiwelding properties, and containing a high percentage of saponifiable, yet readily miscible with water. Dilutions up to 1 to 30 with water will take care of most machining operations."

Mr. Langhammer:

"DURING 1951 production of metal powders increased. Of importance is the fact that the producers worked to and effected improvements making for higher quality and greater physical properties. A stimulus to this end included government specifications for ordnance requirements, plus a demand by parts makers for higher quality and uniformity.

"With the increasing scarcity of strategic materials iron powder moved further into the foreground. Expansions were made and new plants started. Still other important companies are engaged in research and development, which will be of far-reaching effect. After all, iron powder is not too far removed from the coming problem of sufficient high grade iron ore and/or ferrous scrap for blast furnaces, cupolas and eletric furnaces."

A. J. LANGHAMMER, president, Amplex Division, Chrysler Corp., Detroit

IS YOUR BUSINESS FLIRTING WITH A DANCING DIAL?
A BOUNCING BEAM?
INVOICE
. . . or do you use printed recordings

The New Ametron Electronic Scale

The Ametron Electronic Scale records the accurate weight applied to the load cells by printing on ticket, tape, or ledger sheet.

The unit makes weighing easier, quicker and more exact. Being compact, installation is simple as compared with complicated lever systems. It eliminates problems encountered in maintenance because of accessibility of load cells and interchangeability of cells and recorder components.

The Recorder is a full figure step cam controlled mechanism. It includes provision for multiple ranges to give increased capacity with high sensitivity and accuracy.

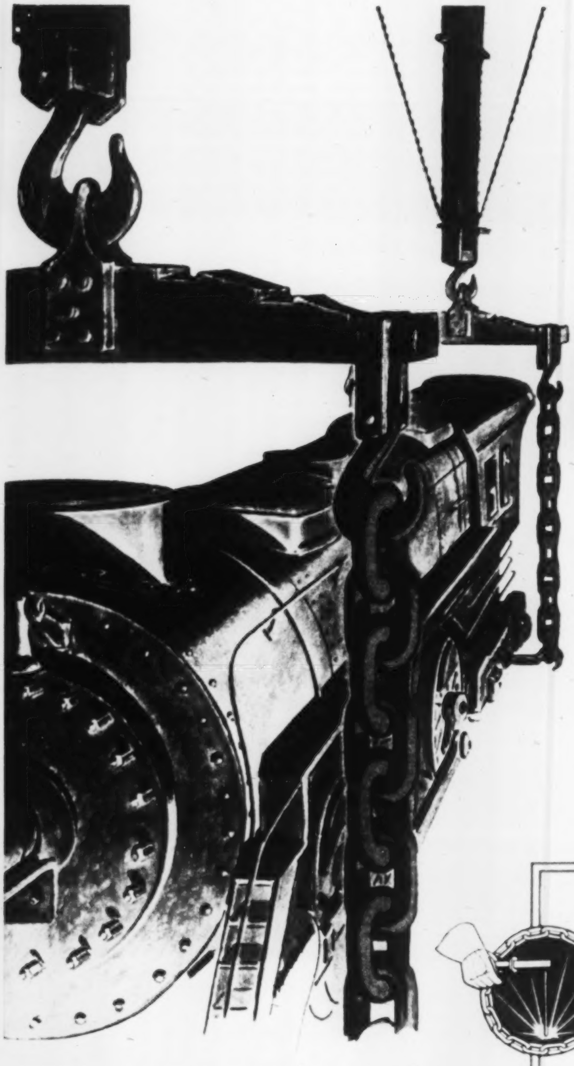
Write for our booklet "The Way to Weigh"

PRINTED RECORDS

STREETER-AMET COMPANY

4101 Ravenswood Avenue
Chicago 13, Illinois

Branches in Pittsburgh, Pa. and Birmingham, Ala.



THE BIG HOOK GOES TO WORK!

Hoisting a 325,000 pound locomotive calls for GOOD chain. That's why McKAY CHAINS are used for extra heavy-duty jobs by railroads and other handlers of large equipment. Too, there's a McKAY CHAIN for EVERY PURPOSE . . . for hoisting the biggest loads and handling the heaviest equipment, right down to chains for doing the smallest jobs in every industry.

SEND for the McKay Sling-Chain Kit. It gives Sling-Chain specifications and shows how to specify sling and other chains used in plants and shops. Write today.

McKAY CHAIN

for Every Use

McKAY—A GOOD NAME FOR GOOD CHAIN—SINCE 1881

The McKay Company • 4[illegible] McKay Building • Pittsburgh [illegible]

Manufacturing & Engineering Services

● IT HAS BEEN said that as much as 30 per cent of in-plant manufacturing involves handling materials from the unloading dock on through to the finished product. Naturally, this figure will vary from plant to plant but there is little doubt that it is substantial.

Even pre-Korea, material handling equipment sales were exceeding $1 billion a year. The emergency and shortage of manpower have further emphasized the need for well-planned handling setups, involving trucks, conveyors, cranes, hoists, etc.

In addition to modern processing and handling, there are many other ways of operating a plant more efficiently. If the product is a precision, high-production item, perhaps it would pay to put in an automatic gaging system. Maybe a few air or hydraulic devices would speed up work and free useful hands for other work.

In these busy days, it might be well not to overlook some plain, old-fashioned good housekeeping. Clean windows and floors, brightly painted machines make employees feel better and work more efficiently. Visiting customers also quickly get the idea that a product made in a well-kept plant is a good one.

Mr Davis:

"INDUSTRIAL trucks now are a vital tool without which industry cannot meet today's needs for faster production and lower cost operation.

"World War II emphasized the many benefits possible with these versatile handling machines. The present rearmament program and its attendant manpower shortage further stimulates truck use.

"As a measure of this increasing interest, Baker-Raulang sales were $5,365,127 in the 11 months ended Nov. 30, 1951, compared with $2,844,904 for the same period in 1950. In addition, recognition of the increased importance of material handling is evident by plans to triple authorized shares of common stock to provide greater flexibility in financing future capital requirements, for possible acquisition of other companies or for expansion of present manufacturing facilities.

"We also are accelerating design, production and promotion programs. Special efforts are being devoted to making industrial trucks more maneuverable, less costly, easier to maintain and more efficient to operate.

"Present designs are being modified by careful study of attachments and combining them wherever practicable to convert single-purpose standard fork trucks into multi-purpose handling machines. As an example, three separate attachments were required to do the work of one new device which combines a conventional side-shifter with an automatic fork adjuster and a clamping device."

Mr. Shepard:

"DEMANDS for accelerated production are speeding the trend to mechanization in the movement of materials. This applies not only to larger plants but as well to plants of smaller size where a mounting production demands that it be moved faster.

"Combination of rising wages, manpower shortages and building costs are making it essential to make use of mechanical equipment to get the work done at all and most certainly to do it profitably. Where conditions do not warrant the use of power equipment, the most modern manual equipment is selected to move production.

"In either case, multiplying manpower by mechanical means does the work more quickly. More complete use of available space is possible by the ability to stack to a greater height than can be done by hand."

Mr. Blum:

"OVERHEAD traveling crane industry has again been required to increase its productive capacity for the defense program. Cranes are being built to expand steelmaking and aluminum facilities and allied industries such as scrap preparation, alloys and carbon making. Cranes also are being built for the Navy, Army and Atomic Energy Commission.

"Ability of the crane industry to expand its facilities to meet the needs of this country has always been one of its virtues. However, the industry now is limited as to productivity by the complicated combinations of priorities and material procurement. We ultimately succeed in obtaining required material, but it is either too late or insufficient in quantity to maintain maximum production.

"This has resulted in record breaking backlogs and excessive shipping commitments. It is the hope of the industry that these conditions will be relieved in 1952 so it can do the job of which it is capable."

Mr. Heinritz:

"1952 OUTLOOK for the industrial battery industry is promising from one viewpoint; not so promising from another. On the sales front, there is a heavy demand for industrial batteries of all types—industrial truck, mine haulage, diesel starting, telephone, utility, railroad AC/CL and railroad signaling. This increased demand not only stems from today's high industrial productivity, but is also a result of technical improvements which demand increasing numbers of electric industrial trucks and railroad diesel engines.

"On the dim side, critical material shortages in lead and other battery materials will make it impossible to supply fully the de-

G. B. DAVIS

vice pres. in chg. of sales, Baker-Raulang Co., Cleveland

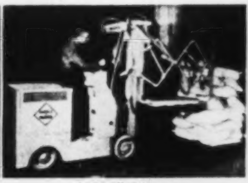
F. J. SHEPARD JR.

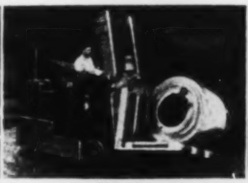
treasurer, Lewis-Shepard Products Inc., Watertown, Mass.

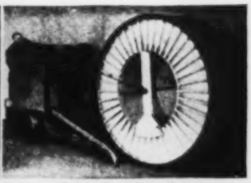
F. M. BLUM

manager, crane sales div., Harnischfeger Corp., Milwaukee

Die Handler

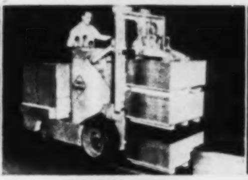

Pallet Retriever


Upender

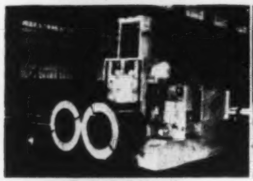

Cable Reel Handler

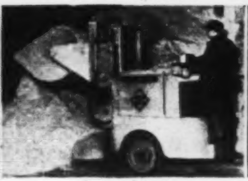
Side Dump Revolving Unit

Roll Handler with Apron


Tin Plate Clamp

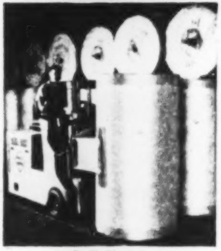
Bale Clamp


Twin Coil Handler

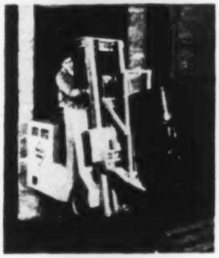

Rotary Scoop

Roll Piercing Truck

3-Ton Low Lift; 1-Ton Crane


Roll Clamp

Special Crane


Drum Handler

Is the answer to your SPECIAL handling problem illustrated?

Only a FEW examples of Elwell-Parker's ingenuity and enterprise in meeting unusual materials handling requirements are shown ... Not infrequently, the peculiar shape or nature of a load makes a standard truck impractical. In specially designing attachments or units for such needs, Elwell-Parker draws on its 45 years of experience, supplying power trucks for over 300 industries ... From its line of 87 different sizes and types, Elwell-Parker can usually select a truck already designed for the job. If not, ask your E-P man about a special unit "tailored" precisely to your needs. The Elwell-Parker Electric Co., 4101 St. Clair Avenue, Cleveland 3, Ohio.

ELWELL PARKER
ATTACHMENTS
Power Industrial TRUCKS

◀ ***NEW ATTACHMENT FOLDER*** describes and illustrates in detail the many attachments for E-P fork trucks. Write for your copy.

ELWELL-PARKER
POWER INDUSTRIAL TRUCKS
Established 1893

mand for industrial batteries. This means, in turn, a shortage of batteries to some users.

"To help battery users get full capacity and life from their present batteries, Gould has inaugurated and will continue its 'Plus-performance plan.' Under the 'plan,' battery users in all fields may obtain free portfolios of information on battery selection and maintenance."

M. W. HEINRITZ, vice president, Gould-National Storage Batteries Inc., Trenton, N. J.

Mr. Wunsch:

"FOUR major objectives of materials handling listed by a midwestern university student were: (1) To provide efficient flow of material; (2) To minimize manual effort; (3) To effectively utilize storage space; (4) To facilitate inventory control. I submit that this is a statement basic to the economy and efficiency of every production plant, large and small, that operates in a competitive system.

"This statement is my thesis here. Materials handling in planning and in development is a science; in application it is an art. Materials handling is even more: It is a philosophy, and for continued progress it must for the engineer and industrialist become a way of life. Materials handling, as straight line thinking, comes instinctively to few, as the gifts for invention or painting. The vast majority must be taught this awareness of effective, efficient materials handling as they must be taught mathematics or a foreign language.

"Excepting for the few, with God-given genius, the majority of people in industry, including engineers, have no inherent awareness and are utterly illiterate in materials handling. Cost of this illiteracy to industry at last is being appreciated. We must inculcate this awareness, this consciousness of effective materials handling in all engineering students and, of course, especially all industrial engineers and mechanical engineers going into productive industry. This calls for full cooperation of the Material Handling Institute, the Material Handling Society and its chapters with our engineering schools. Manufacturers of equipment and the large industrial companies ought to, as a matter of enlightened self-interest, assist our engineering schools and universities with funds to encourage materials handling education."

Mr. Sears:

"EVERY industry, whether large or small, whether production or service, has one common denominator—handling.

"Even under the most favorable conditions, everything produced has to be handled. And surprisingly enough, cost of moving a finished product from production line to shipping dock frequently amounts to more than moving it across country.

"As I see it, top management's greatest single opportunity to cut costs and keep products moving faster through the plant and on to the consumer, is to mechanize handling methods as nearly 100 per cent as possible.

"Handling techniques at the disposal of plant executives are virtually unlimited, and final decisions will depend on many factors including types of products handled, plant layout, availability of space, and need for flexibility to assure greatest possible usefulness from the handling equipment.

"I have purposely omitted manpower from the factors above because, frankly, manpower is the most costly item in most handling systems. It is for this reason that the object of a modern materials handling plan is to greatly reduce manpower in all in-plant transportation, lifting, loading, unloading, and storage operations, assigning that manpower to much more productive tasks.

"It's simple arithmetic. If it takes 10 men one hour to handle 10,000 pounds by manual methods, 10 man-hours are spent on a job accomplished easily in one man-hour or less with the proper materials handling method. That means at least 9 men could be released from a time-consuming, wasteful job, and put to work on far more productive jobs elsewhere in the plant. That 90 per cent saving is not unusual. It is, in fact, typical of savings in all phases of receiving, processing, storage and distribution.

"Most significant is the depend-

J. W. WUNSCH

president, Silent Hoist & Crane Co. Inc., Brooklyn, N. Y.

LESTER M. SEARS

board chairman, Towmotor Corp., Cleveland

H. G. WALTER

president, Gerrard Steel Strapping Co., Chicago

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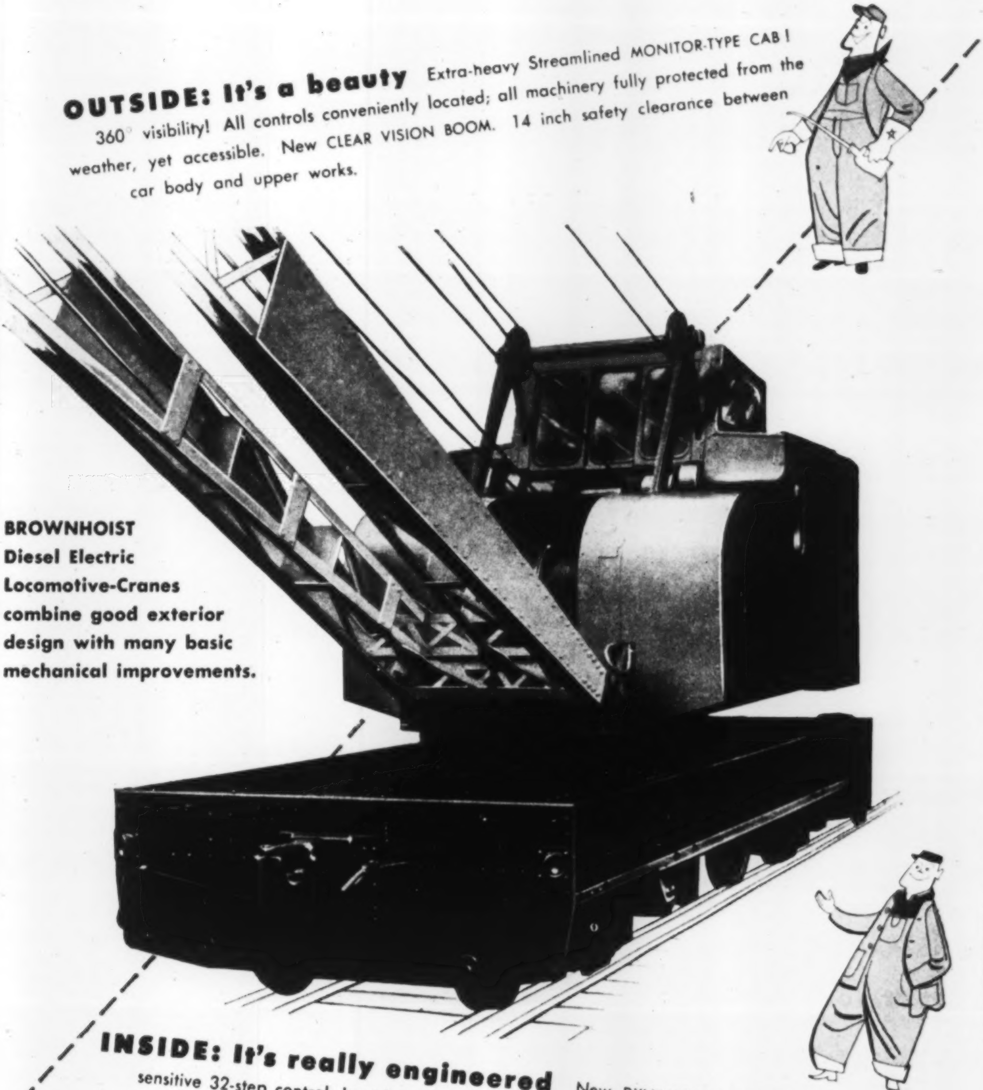
Extra-heavy Streamlined MONITOR-TYPE CAB! 360° visibility! All controls conveniently located; all machinery fully protected from the weather, yet accessible. New CLEAR VISION BOOM. 14 inch safety clearance between car body and upper works.



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New DYNAMATIC CLUTCH gives smooth, sensitive 32-step control, banishes slippage, eliminates torsional impulse and vibration. Safe FRICTION CLUTCH BOOM HOIST driven by worm and wheel in oil bath. Twin-barrelled, extra-large boom-hoist drums take all line in one layer. New Wide-faced Hoist Drums mounted on roller bearings with air cylinder mounted within the drum. ELECTRIC ROTATION and electric travel reduce maintenance to a minimum. Optional features include 8-WHEEL CHAIN DRIVE for increased drawbar pull and TWIN ENGINE DRIVE where greater tractive effort is required.

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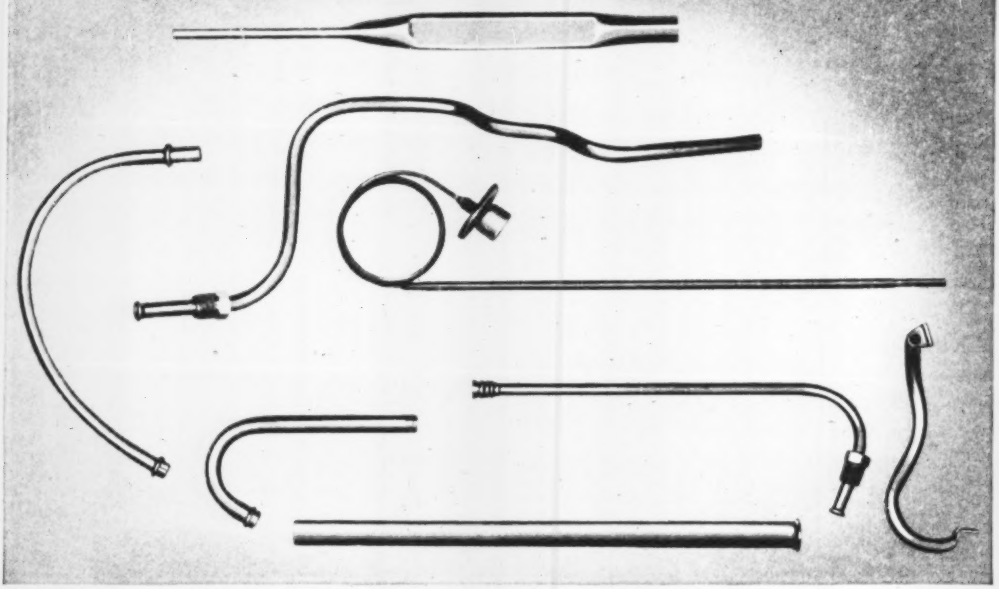

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AVON TUBE DIVISION

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ence on fork lift trucks for speedy movement within plant of loads up to 15,000 pounds. Used alone, or with overhead cranes, hoists, conveyor systems, and so forth, fork lift trucks have recorded such dramatic savings as: 75 per cent reduction in car loading costs; tripled storage capacity in warehouse areas; 400 per cent increase in productive output . . . and many more. These actual dollar savings are just part of the overall story. Of equal importance are the vast number of injuries prevented, of product damage eliminated, and employee morale boosted through better working conditions made possible by streamlined handling methods."

Mr. Walter:

"NPA Limitation order M-59 prevents strapping of small cartons, boxes and crates, with a view to saving steel. The strapping industry has been developing methods of reinforcement packaging that not only save steel but other packaging materials and labor, all resulting in decreased cost.

"Bundling of two or more products, many times without necessity for other protection, can be done by mere strapping of a number of wood boxes or paper cartons into a single bundle. Savings in labels, writing of freight bills, handling and most important, the omission of outer large shipping cartons result. Savings in using round steel, without benefit of any auxiliary fasteners, also adds to ultimate economy.

"Glazed storm sash with but two single strips of corrugated board at top and bottom of a unit of four sash are reinforced this way with round steel strapping. A well-known mail-order house inaugurated this idea. Handles are strapped to carpet sweepers and to vacuum cleaner cartons so that the units are never lost or separated. Gypsum board, asphalt shingles, hardwood flooring, glazed millwork doors and windows, electrical fixtures (5 cartons per unit), zinc, tin and aluminum pigs, tin cans in bulk, bread and cake cartons, box shooks, barrel heads, fire and face brick, concrete and building tiles, automotive (passenger car, truck, road and farm machinery) axles, transmissions, springs and other parts (largely for inter-plant shipment or to assembly plants) are only a few of the bundling or unit strapping applications."

Mr. Bucuss:

"AS metalworking industries stride toward maximum capacity, materials handling programs take on new meaning. Only as barriers to efficient and economical product-flow through the plant and to the customer are broken down, can optimum output be reached.

"One outstanding development was the integrated conveyor program set up by a midwest sheet metal producer. Coils are strapped for intra-plant handling, passing through finishing operations on a conveyor. Finished sheets and coils on skids travel down separate conveyors where they are inspected, wrapped, re-strapped, weighed and carried to the shipping bay.

"Other metal producers are moving toward bulk units convenient for mechanized handling. Strapped bundles and pallet loads are being adopted on all forms of metal and metal products. Trend toward unitizing through steel strapping is a major factor in meeting the challenge of increased efficiency for a defense economy."

Mr. Mallick:

"JOINT effort of the Material Handling Division—American Society of Mechanical Engineers and the American Material Handling Society in sponsoring a material handling handbook is significant.

"Until this comprehensive project was undertaken, material handling, as such, was a topic for discussion, rather than an organized field of engineering and management.

"Efforts of the two societies in correlating the data, establishing fundamental laws, reconciling nomenclature and systematizing the classification of equipment has been boundless. The value of this research in the form of concise approach to the solution of material handling problems will be of extreme value to the practicing engineer. The handbook will also be a boon to colleges and universities as a reference for students of material handling.

"While it will be several years

JOHN G. BUCUSS

president, Steel Products Division, Acme Steel Co., Chicago

R. W. MALLICK

executive dept., E. Pittsburgh divs., Westinghouse Electric, E. Pittsburgh

A. F. ANJESKEY

sales mgr., Cleveland Tramrail Div., Cleveland Crane & Engrg. Co., Wickliffe, O.

before the handbook will be off the presses, the data it will contain will begin to filter out into industry far in advance of publication.

"It behooves industry to put this information to test and report experience obtained to the societies, in order to make this 'bible' of the industry as formidable as possible.

"Foundation for a material handling science that material handling men everywhere have been seeking for years is soon to be a reality. Let us do our best to build it well."

Mr. Anjeskey:

"AN automatic latching device for transfer bridges permits pre-setting the interlocking mechanism on the transfer bridge as it approaches a spur track, when the bridge automatically latches. The operator can immediately thereafter transfer the carrier with its load from the bridge to the spur track. This is important when handling molten metal in a foundry as it permits transferring the ladle quickly without stopping the bridge to latch it manually with a spur track.

"Another significant development is the new method of dispatching train loads of materials from one point to another automatically. This is accomplished with a tractor driven carrier unit on which loads are suspended, with a unit so controlled that it starts and stops automatically as the carrier unit or train ahead of it travels along the track.

"Heretofore a block system has been generally used which slowed down dispatching operations because the forward train had to pass through a block system before the train behind it would start automatically. Trains now can follow one another without the necessity of providing a space equivalent to a train length between trains. This permits not only increasing the speed of dispatching but the operation of additional trains.

"It is possible to dispatch a train from a main line into a spur track, automatically throwing spur switches without an attendant. Installations have been made where individual carrier loads of four tons have been coupled together into a train, and as much as 40 tons have been transported."

Mr. Webb:

"DURING World War II, many studies, surveys and experiments had to be made before producers were convinced that conveyorization was as essential to manufacturing as machine tools and men. But before that war's end, it was demonstrated that mass production is thoroughly dependent on a backbone of continuous, conveyorized systems.

"Now, from the mines, to the mills, to manufacturing, to warehousing, to shipping, it is not a question of whether conveyors should be used, but a question of how many, what kind, how automatic, how comprehensive should the system be.

"Integrated with all other means of handling, the conveyor has an important place in every industry."

Mr. Schreiner:

"PRESENT situation in obtaining replacement parts for steel mill and earth handling equipment has emphasized the role that submerged arc welding can play in reclamation of worn parts. Hard, long-wearing surfaces can be deposited with speed and economy. Deposits are so smooth and regular that many times no final machining is required.

"Three major wearing parts of earth moving equipment—track links, rollers and idlers—can be readily rebuilt at a cost considerably less than that of new parts. In the past, rebuilding work was complicated since the user had to obtain, design, and assemble all of the equipment himself. But today, complete machines completely wired and ready for operating are available from several fixture manufacturers. Generally speaking, equipment for rebuilding steel mill parts has to be assembled by the user. But with the myriad of machines available today, the user can assemble a setup to do his job without any trouble. Overall cost savings of from 30 to 60 per cent have been reported.

"The year has brought increased acceptance of the multiple electrode principles of submerged arc welding. The series arc method is

JERVIS C. WEBB

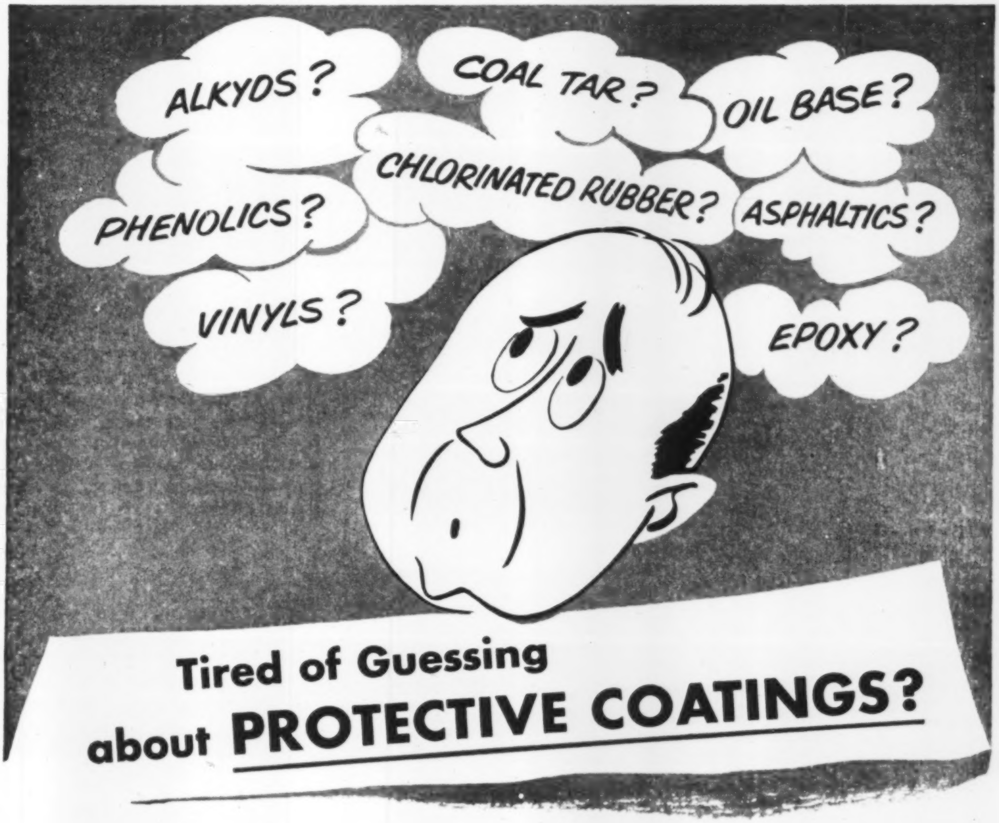
treasurer & general manager, Jervis B. Webb Co., Detroit

N. G. SCHREINER

manager, Unionmelt Service & Development, Linde Air Products, New York

J. L. BRAY

head, school of chemical & metallurgical engrg., Purdue University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As a matter of fact, you can't *afford* to guess about protection these days. With equipment so expensive and hard to replace, it's imperative that you use the coatings *specifically* compounded to protect against the type of corrosion encountered at *your* plant . . . and to do it efficiently and economically.

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COAL CHEMICALS • AGRICULTURAL CHEMICALS • PROTECTIVE COATINGS • PLASTICIZERS • ACTIVATED CARBON • COKE • CEMENT • PIG IRON being used for deposit of stainless steels for widely different types of corrosion resistance. In one instance, an 18-8 chromium-nickel deposit is being made on water turbine blades to obtain resistance to erosion and cavitation. This is now standard practice by one of the major hydraulic equipment manufacturers since deposits more than meet specifications of the Corps of Engineers. In another instance, this method is used for depositing the stainless steel sealing bead at the welded joints in stainless clad vessels. This cladding is for resistance to chemical corrosion. The deposits meet the requirements of the major chemical companies."

"METALLURGISTS are concerned increasingly with the problem of dust, fume and smoke. Recent local ordinances (with consequent improved living conditions) have focussed attention on the old problem. New techniques, notably the use of oxygen will intensify this problem shortly. More often the situation can be eased by the use of the proper apparatus and treatment.

"High stacks, or the moving of plants to open country are not solutions. Rather we must reduce the hazard by efficient combustion of fuels and by the use of treatment plants to reduce the dust loading of the gas to a point where it is no longer a hazard.

"Of the apparatus proposed the dry cyclone is the least expensive but really satisfactory only with relatively large particles. Spray washers and scrubbers are quite efficient on particles over 5 microns but relatively inefficient on the submicron ones. True some scrubbers remove about 95 per cent of the particles, but the average would be closer to 75. Bag filters collect up 95 per cent but are sensitive to overloads, high temperatures and corrosive gases. The electrostatic precipitator, particularly when combined (frequently superimposed) with a wet washer is the efficient dust collecting apparatus available at present, but it is expensive and, like the bag house, sensitive to overloading.

"Stream pollution is, because of the rapidly increasing population and the changing character of our government now a real industrial problem. To a great extent it is being solved by proper treatment plants. As certain as death and taxes the dust problem must likewise be met and solved through the development of new apparatus which will by increased collection efficiency, lower materially operating costs, cost less to install."

"USE of air in metal industries is an increasing necessity. Many centrifugal and axial flow fans are now being made of special metals or alloys, depending upon the service for which they are required. Use of these alloys sometimes requires a redesign of the fan, with resulting lighter weight and often better performance.

"Of great importance to the metals industry is the handling and control of dust, fumes, gases and other air contaminants, which undoubtedly presents the greatest challenge and opportunity for the years ahead. Proper cleaning of industrial air means better health for employees and neighbors, salvage of materials, elimination of fire and explosion hazards and an improvement in product quality.

"In the field of special metals production, many additional uses for blowers are to be anticipated. A recent plant for the production of aluminum is generating its large power requirements with radial diesel engines, each of which requires a large high pressure scavenging blower."

"THERE were few, if any, radical advances in materials handling technology and equipment in 1951. Most efforts were bent to filling high demand for equipment needed by the armed forces and defense supporting industries. World's largest ram trucks, built to carry 80,000 pound steel coils, have been in operation for about one year now and have proved successful. Trend to standardize on larger coils is indicated by orders for two even larger trucks of 100,000 pound capacity. Diesel powered fork lift trucks are finding increasing use for special applications.

"Refinements in palletless hand-

EDGAR F. WENDT

Buffalo Forge Co.
Buffalo

E. F. TWYMAN

vice president, Yale & Towne Mfg. Co., Philadelphia

M. A. HOLLENGREEN

president & general mgr., Landis Tool Co., Waynesboro, Pa.

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Standard—36°, 38°, 40°, and 42° Baume

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ling continue with attachments for just about any common shape or size found in industrial products. Steel producers are concentrating more and more on unit loads of firebrick and other supplies. One steel producer cut brick unloading man-hours over 50 per cent with a fork truck and since it wasn't used all the time, bought a hydraulic scoop for use in unloading bulk ores like ferromanganese. Even greater savings were effected on car unloading manhours for this and similar dense, hard-to-shovel materials.

"Work is progressing on a method for placing of steel directly on mandrels of a rolling mill. An application of this type has proved successful for aluminum coils and we hope to apply it to steel in the near future."

Mr. Hollengreen:

"EVERYONE admires a clean, orderly manufacturing plant—at least that's what we have found out from the visitors to our shop. However, our purpose was not to build a show-room type of shop, but an efficient plant that can produce products at a reasonable profit.

"We are convinced, from our own experience, that establishment and maintenance of an orderly shop is essential to demands for increased production.

"Here are a few of the ways in which we have observed benefits of good housekeeping:

(1) Low accident rate due to orderly placement of machinery and parts in process.

(2) High worker morale. Low labor turnover due to pride in working conditions.

(3) Good customer relations. Visitors are always impressed with the way in which good housekeeping is reflected in the quality of the products which they are buying.

(4) Precision machinery kept in top operating condition, not affected by excess grit or foreign matter on ways and feed screws.

(5) Efficiency in moving and placing parts in process.

(6) Low cleaning maintenance. Easy to keep clean aisles and floors reduce labor.

"Many advances have been made by concerns in this policy of good housekeeping. We should never be too busy to take time to set this program in motion. I'm sure that you will find that it pays off in many tangible ways."

Mr. Willson:

"CONSERVATION of critical materials will be a major objective of industry and government for the duration of the current crisis in defense mobilization. Worthwhile as this is, there is urgent need for conservation of another kind, but one just as vital to our industrial production. I refer to the conservation of manpower through the obvious expedient of providing them with necessary personal safety equipment and enforcing its use.

"Although much has been done by industry in general along these lines, a great deal more can be done. This is particularly urgent as industrial employment grows, because records show that inexperienced workers are more likely to be involved in accidents than are their more experienced coworkers.

"The safety equipment industry is doing everything in its power to maintain prompt delivery of safety devices such as goggles, respirators and gas masks, but we are having the same problems as heavy industry with reference to supplies of scarce metals. Although our use of critical materials is relatively small, they are vital to the production of safety equipment. Our continued production depends on the availability of these scarce raw materials. We can only hope that allocation plans for 1952 will recognize the essential nature of safety equipment in the conservation of manpower."

Mr. Sutherland:

"IT has become increasingly important that all members of our organization become cognizant of the cost factors in making a ton of product. Each department supervisor must become as efficient as possible in all phases of his operation.

"The Steel Division of the Ford Motor Co. has expanded and intensified its training program. Training is directed to personnel,

THOMAS A. WILLSON

president, Willson Products Inc.
Reading, Pa.

J. K. SUTHERLAND

mgr. of operations, steel plant div.,
Ford Motor Co., Dearborn, Mich.

W. O. VEDDER

manager, dust control dept., Pangborn
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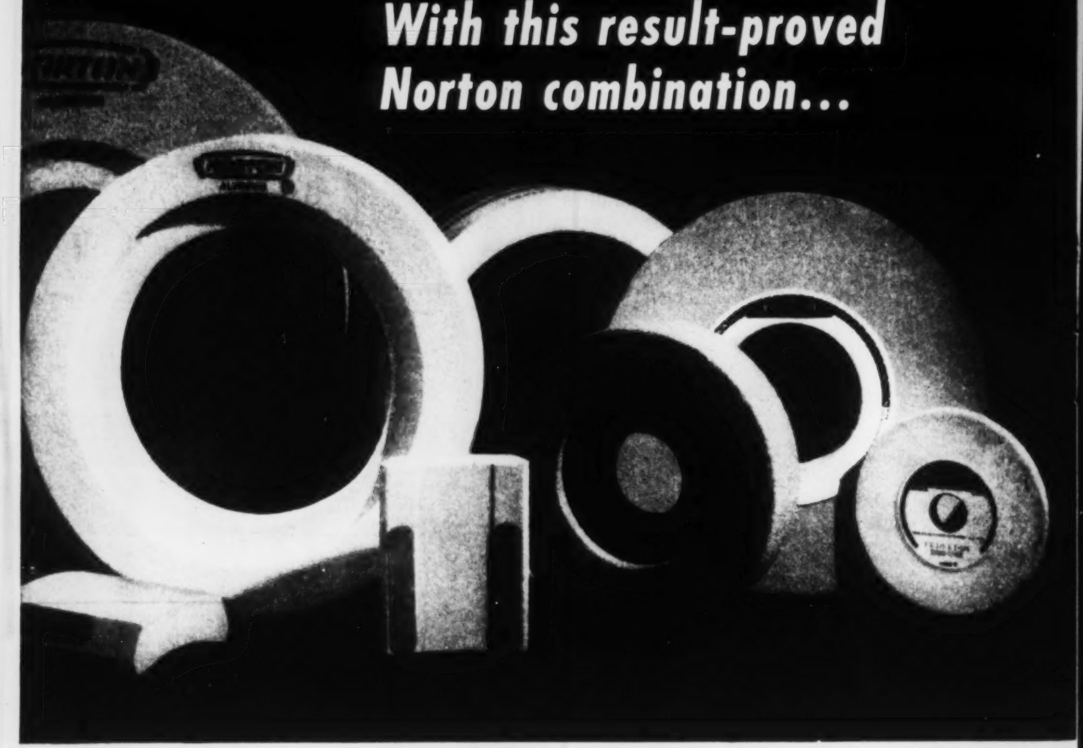
With this result-proved Norton combination...



Best In Abrasives. For every surface grinding job in your plant, there's a type of Norton abrasive — ALUNDUM* (fused alumina) or CRYSTOLON* (silicon carbide) — with the exact cutting characteristics you need for fast, cool, accurate grinding and extra long wheel life.

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Expert Application. See your Norton Distributor for prompt aid in selecting the *right* wheels, cylinders or segments. If your problems are unusual, he'll call in a Norton Abrasive Engineer. And remember to get your copy of the brand new Norton book, "The A.B.C. of Surface Grinding."

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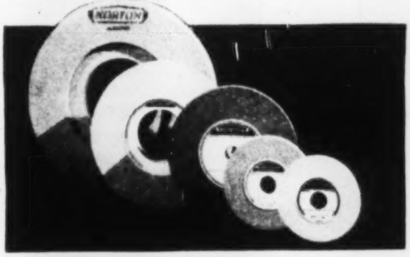
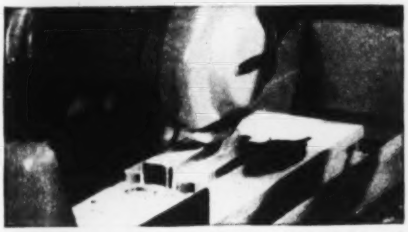
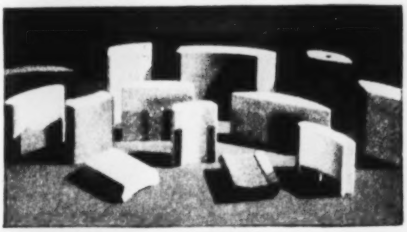


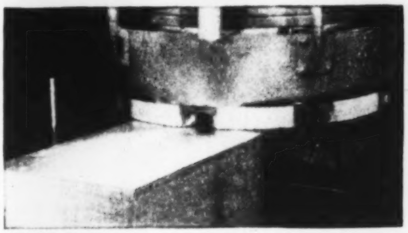
Straight Wheels



Cylinders



Segments



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A Norton chuck with Norton segments can increase output and lower costs on many vertical spindle surfacing jobs where contact is broad. Light and simple in construction, it takes the place of cylinder and back plate, can be mounted without machine alterations — and segments can be changed or adjusted without removal of chuck. Produces a faster, cooler cut and saves valuable time.

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NORTON
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Making better products to make other products better safety and cost:

"Better 'human relations' were accomplished through management meetings, newsletters and supervisory conferences. Employee benefits have been explained through films, posters and booklets. Employee suggestions have increased 34 per cent. Training conferences with supervisors have enabled 'the two-way flow of communication' to produce desirable results.

"'Safe Work Practices' has been our motto for 1951. This was emphasized by 'Safety Is Everybody's Business.' Safety training conferences were conducted by foremen. Minor injuries were investigated and action initiated to eliminate causes. Thus, frequency of accidents has decreased. People are prone to take unsafe positions. This has been emphasized as the cause of accidents that can be eliminated if people will 'think.'

"We are endeavoring to acquaint all concerned with the factors that influence cost. Meetings are held with supervisors by departments. Local cost problems are discussed and control of more costly items has been encouraging. Information on cost progress is distributed to keep supervisors up to date and to point out arrangements where remedial measures must be taken.

"Training becomes increasingly more important to enable supervision to meet the ever changing needs and problems of the industry. Benefits of training should be apparent in the long run by having more efficient personnel and good operations."

Mr. Vedder:

"RESEARCH and development in dust and fume control centers around equipment accomplishing higher consistent overall recoveries on micron size particles over a wide variation of application problems. Such activities embrace recovery equipment of all basic types centrifugal; scrubbers; electrical precipitators and filters.

"In the filter field, development continues on synthetic fibre fabrics to extend practical operating temperature and improve chemical resistance. A number of such fabrics, of varying properties and construction, are being tested under field conditions.

"Research effort and study continues on more accurate, uniform, yet simplified, test methods for air pollution sampling, particularly for field use.

"Air pollution control ordinances are being enacted in increasing number. This action brings to manufacturers the responsibility of controlling smoke, fume and dust produced in their operations. Industry, government and equipment manufacturers are working in close cooperation to accomplish this result as effectively, yet economically, as possible. Increased attendance at local, state, and national air pollution and industrial hygiene meetings attest this fact.

"Proper and thorough maintenance of industrial equipment, including dust and fume control equipment, is being increasingly emphasized by management, particularly because of short supply and hard-to-get repair parts. Equipment manufacturers are endeavoring, through instructions and field service, to assist industry in setting up recommended maintenance schedules and procedures, so that maximum performance, benefit and life can be obtained from equipment."

Mr. Steen:

"MANY product acceptance specifications have been established on minimum standard requirements. This method of rating a product may have had some foundation in the past, in ignorance or in expediency, when little was known by the majority of specification writers, of the concept of product or process average ratings as differentiated from ratings applying to an individual item, and much less was known concerning the actual application of such scientific methods to the subject in question.

"It is possible to set ratings on the basis of minimum standards which when reduced to simplest terms mean the establishment of minimum and/or maximum inspection limits for individual items. Contrasted to this method is the one of establishing ratings, not for the individual, but for groups of individuals. With this kind of a rating system boundaries can be set up for groups of items (samples) including limits for the average (mean) and for the dispersion (standard deviation).

"In effect this is equivalent to an approximation of the shape and limits of the universe (population) from whence the samples came and presents a fairly accurate picture of what may be expected, over the long run, whereas the evaluation of a single passable item gives practically no information whatsoever relative to its source, or how it may be expected to compare with other items from the same source.

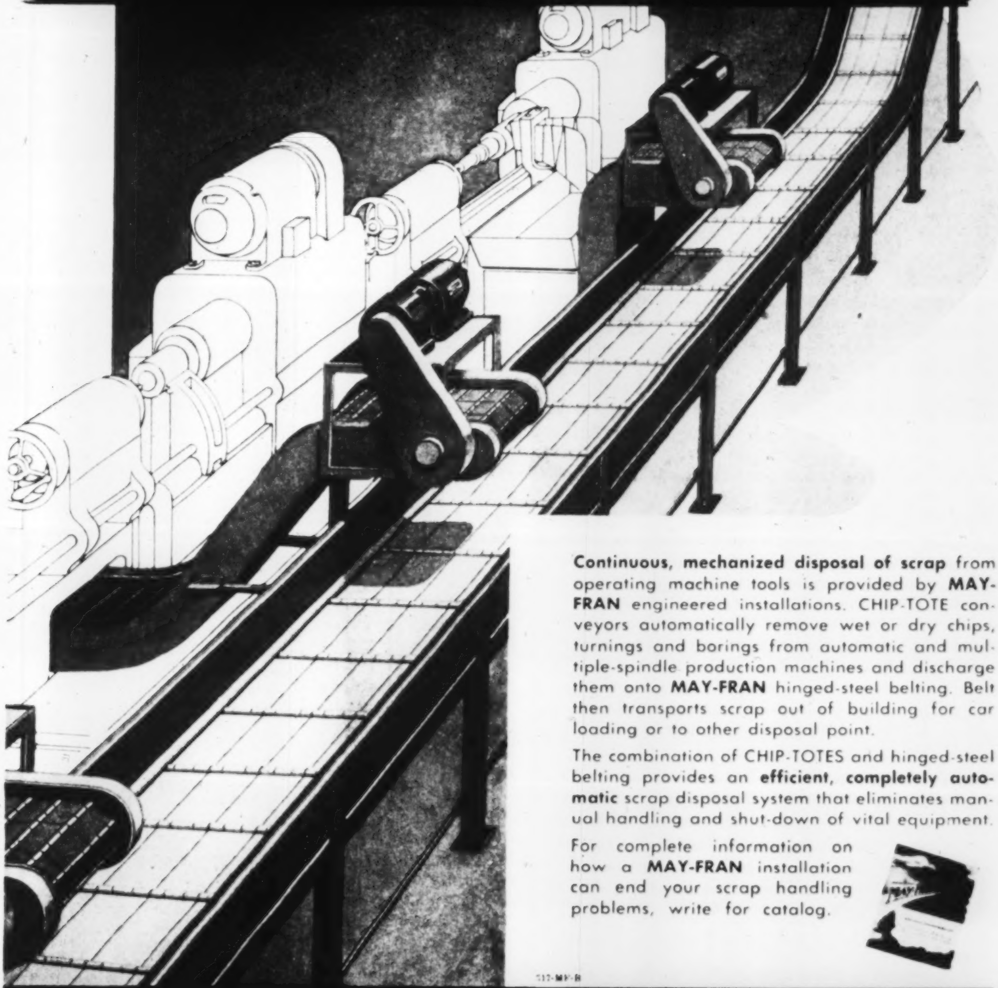
"Taken together, therefore, these two statistics (mean and standard deviation) give the user of the product, or the designer who incorporates the product in a more complicated product, a great deal of information that is unavailable from a rating based upon minimum industry standards. Such methods of rating are becoming of ever greater importance in view of a rapidly expanding technical economy, and the resulting need for greater precision.

"As the nation's technical advances increase at an ever expanding rate, the need for reproducibility and reliability will increase at an even faster rate. Therefore, the day of the product minimum specification is fast disappearing and our continued progress will bear no small relation to the fact that we are able to recognize this

JEROME R. STEEN

director, quality control, Sylvania Electric Products Inc., New York

MECHANIZED SCRAP HANDLING SPEEDS PRODUCTION



Continuous, mechanized disposal of scrap from operating machine tools is provided by **MAY-FRAN** engineered installations. CHIP-TOTE conveyors automatically remove wet or dry chips, turnings and borings from automatic and multiple-spindle production machines and discharge them onto **MAY-FRAN** hinged-steel belting. Belt then transports scrap out of building for car loading or to other disposal point.

The combination of CHIP-TOTES and hinged-steel belting provides an **efficient, completely automatic** scrap disposal system that eliminates manual handling and shut-down of vital equipment.

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fact and to do something constructive about it."

Mr Sims:

"RESEARCH can truly be considered one of our most important economic resources. From purest fundamental research to so-called engineering development type, where basic science is harnessed and put to work, it has been responsible for some of our most spectacular industrial developments. In less spectacular manner research has quietly gone to work to improve processes and products, avoid obsolescence.

"Industry and government are currently investing in research at an annual rate of $2 billion. Allowing for depreciation, this is more than two and one-half times the expenditures of 1940. This indicates growing belief in the need and value of research, not only for pioneering but also for keeping industry out of trouble. Even relatively small companies may spend several hundred thousand dollars a year settling claims, investigating customers' complaints, or replacing defective products, and consider such outlays normal expenditures. Some, however, are being convinced that it is better to spend a small fraction of that amount on research to obviate the need for spending the larger amount.

"There is a growing awareness of the need for deliberate, systematic analysis of research and development programs. Where a product is involved, it is good business also to obtain an intelligent estimate of the potential size and nature of the market for such an item, anticipated competition and the source and probable future supply of raw materials. Such an appraisal requires teams of engineering economists."

C. E. SIMS

supervisor, metallurgy, Battelle Memorial Institute, Columbus, O.

Mr Polk:

"AIR gages are growing in popularity as numerous new applications are found for this versatile method of inspecting critical dimensions at the machine, in inspection departments or on a sampling quality control basis. Industry is placing greater emphasis on quick, accurate gaging that shows part quality at a glance or automatic classifying of pieces. Air gages or combination of air and electric gages are proving the best solution to many of these problems.

"Trend continues toward the greater use of fully-automatic or semi-automatic gages and gaging machines for rapid inspection of mass production items with substantial reduction in inspection costs. This is particularly true in the automotive and electric appliance industries and for defense materiel, especially shells and aircraft parts. While the requirements for greater precision are steadily increasing, the gaging and precision instrument manufacturers are meeting these needs with new and better products and methods and are working very closely with production executives to provide the kind and type of inspection equipment that will solve their constantly changing problems."

Mr Heppenstall:

"ONE very effective quality control practice has been injected into melting high quality steels in our acid open-hearth furnaces. An accurate and entirely practical liquid bath temperature thermocouple has been installed to record bath temperatures. Specific knowledge of bath temperatures makes possible proper timing of ore additions, and correlation of this information with furnace reaction information such as removal of manganese, silicon and carbon enables the addition of ore at predetermined optimum temperatures.

"This reduces refining time and improves quality control. The use of the thermocouple and its proven accuracy has made possible a reduction in tapping temperatures and has reduced holding time in the ladle. The use of the thermocouple, therefore, makes for better furnace and pouring practice, which has definitely added to the quality of our open hearth steels."

"The thermocouple is also being used in our electric induction furnaces, but less benefits are derived because of the fact that practically no refinement takes place."

R. B. HEPPENSTALL, president, Heppenstall Co., Pittsburgh.

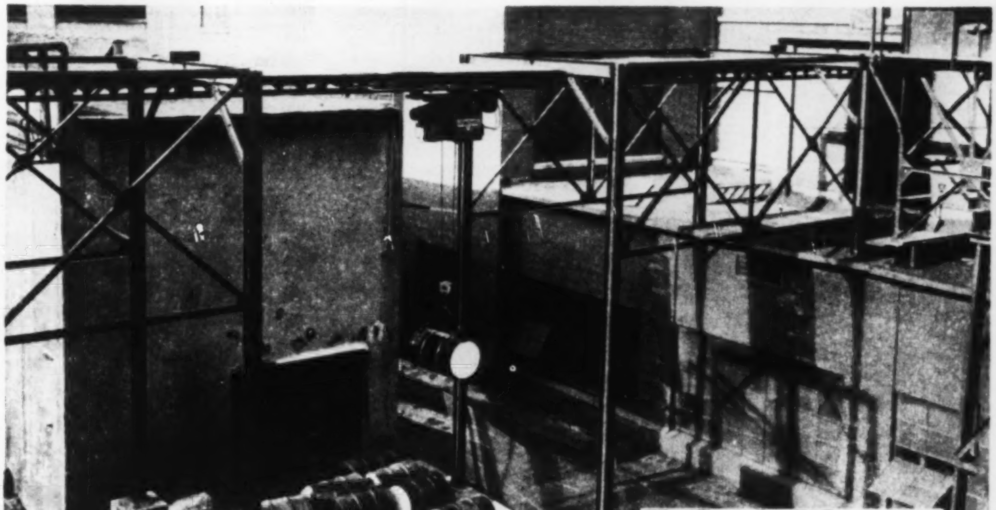
Mr Setzler:

"QUALITY control is often interpreted to mean inspection. However in the true sense of the term, inspection is but one operation in the control of the quality of a product. I believe this is especially true in the manufacture of weldments. The old adage that, 'Quality cannot be inspected into a product, it must be built therein', is most certainly true in weldments.

"Economic laws demand that a product perform certain functions satisfactorily and at the least cost. The building of a perfect product at double or triple the cost accomplishes nothing in the modern competitive world. Regardless of some loose talk to the contrary, those of us in the fabricating game know

LOUIS F. POLK

president, Sheffield Corp., Dayton, O.



Carrier at intermediate station where it has stopped automatically as preselected. The Tramrail track is about 30 feet above ground level.

Starting a heavy drum on its way from the warehouse by depressing a wall mounted push button. Hoist capacity is 2,000 lbs.

Automatic Dispatch System Eliminates Need of Three 10-Ton Trucks

An outside system operating between three buildings

Not only was the need of two 10-ton trucks obviated by a Cleveland Tramrail automatic system at the Mica Insulator Company, Schenectady, N. Y., but the purchase of a third truck was made unnecessary. While the trucks had to travel over a circuitous route, only a short, straight Tramrail track is required for the overhead system.

Many man-hours of trucking and handling time are saved because materials dispatched over the automatic Tramrail system can be handled by production workers along with their regular jobs. A great amount of handling on an elevator has also been eliminated and better elevator service is available for other purposes.

The system has been found particularly helpful during night shifts when an extra drum of varnish or roll of cloth is sometimes needed. Formerly trucks were never available for night hauling. The Tramrail equipment paid for itself out of savings it created in a short period.

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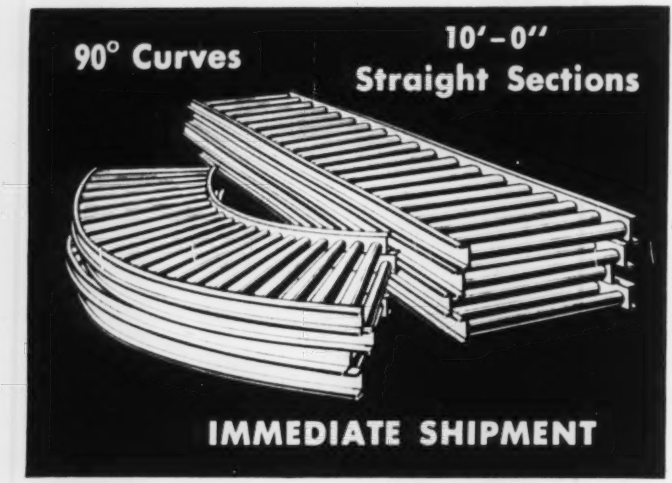

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SHAFT — 7/16" Hexagon Cold Rolled Steel. Positively locked against rotation by hexagon holes in frame.

BEARING — No. 50. Slip fit in cup, easily removed and replaced. Protected position—set back from end

FRAME — 3½" x 1¼" x 10 Ga. Pressed Steel Channel. With four 1-5/16" O.D. 13 Ga. Welded Tubing ties per 10'0" section. Capacity 75 lbs. per foot with supports on 10'0" centers and 380 lbs. per foot with supports on 5'0" centers.

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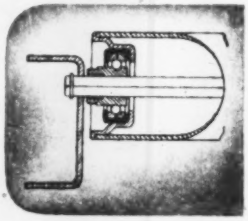

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that we are in a highly competitive field in which other methods of fabricating such as casting, forging, stampings etc. are often found most economical. Therefore, we must concern ourselves with the problem of producing a satisfactory weldment at a price.

"Inspection happens to be something that management can buy as much or as little of as they desire. It is merely a matter of economy as to how much and what kind is bought. Unfortunately it is difficult to evaluate the true value of inspection. The better the shop the less need for inspection."

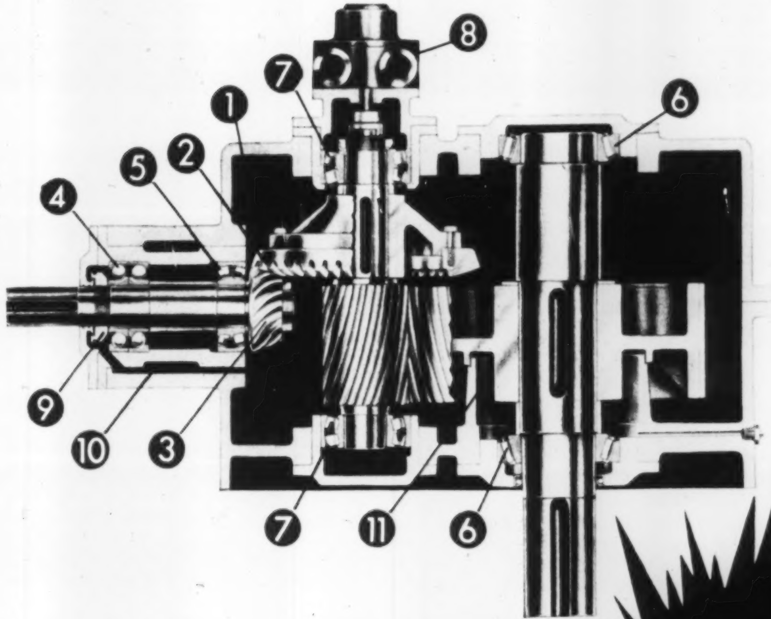
P. H. SETZLER, Baldwin-Lima-Hamilton Corp., Hamilton, O.

Mr. Tobey:

"NON-DESTRUCTIVE testing again is called upon to lower cost and raise quality of manufactured products. Industrial radiography is versatile and provides a permanent record of the internal soundness of the subjects examined. Equipment and methods are available to record the 'inside story' of specimens ranging from thin paper, cloth and plastics, to dense high temperature alloys and steel sections with thicknesses exceeding 20 inches.

"Improved x-ray generating equipment was placed in service in 1951 and many machines will be installed in 1952. Facilities are now available to produce industrial radiographs both faster and of better quality. These improve-

ROYAL G. TOBEY
X-Ray Division, Eastman Kodak Co.
Rochester, N. Y.



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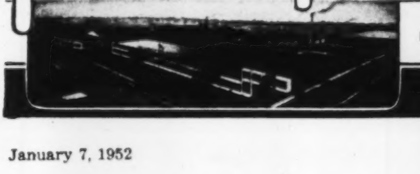

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ments have resulted primarily from higher energies and smaller X-ray source size.

"Progress has not been limited to giant X-ray machines required to study thick steel sections. Many capsules of cobalt-60 were put in use for industrial radiography last year. These are by-products of government operated nuclear reactors and available at low cost. Higher specific activity sources are now being supplied which can produce better radiographs more quickly than was possible with earlier sources. One more supplier of cobalt-60 brought out a handbook or manual on radiography last year and expects this year to make two additional artificially radioactive elements available for improved radiography of thinner or less dense materials than those best done with cobalt-60. Radium is still available on a rental basis and is a suitable radiation source for many radiographs. Basic materials needed to establish a limited gamma ray radiographic laboratory can be secured for less than $200.

"Research and development continue on X-ray inspection methods which do not provide the usual film record. Although progress in this direction is being made, it appears likely that the use of conventional film radiography will continue to increase for some time."

Mr. Kahn:

"CAPACITY attendance at the convention of the Society for Non-Destructive Testing last fall attested to the ever increasing role non-destructive testing plays in stepped up production for defense. Speakers emphasized the importance of having only top quality materiel cleared for assembly and that only assemblies free from flaws be delivered to the military. The society has dedicated itself to serve industry in improvement of existing non-destructive testing methods, in preparation of recommended practices and standardized evaluation of results of non-destructive testing, and in training personnel.

"Technical program included TV

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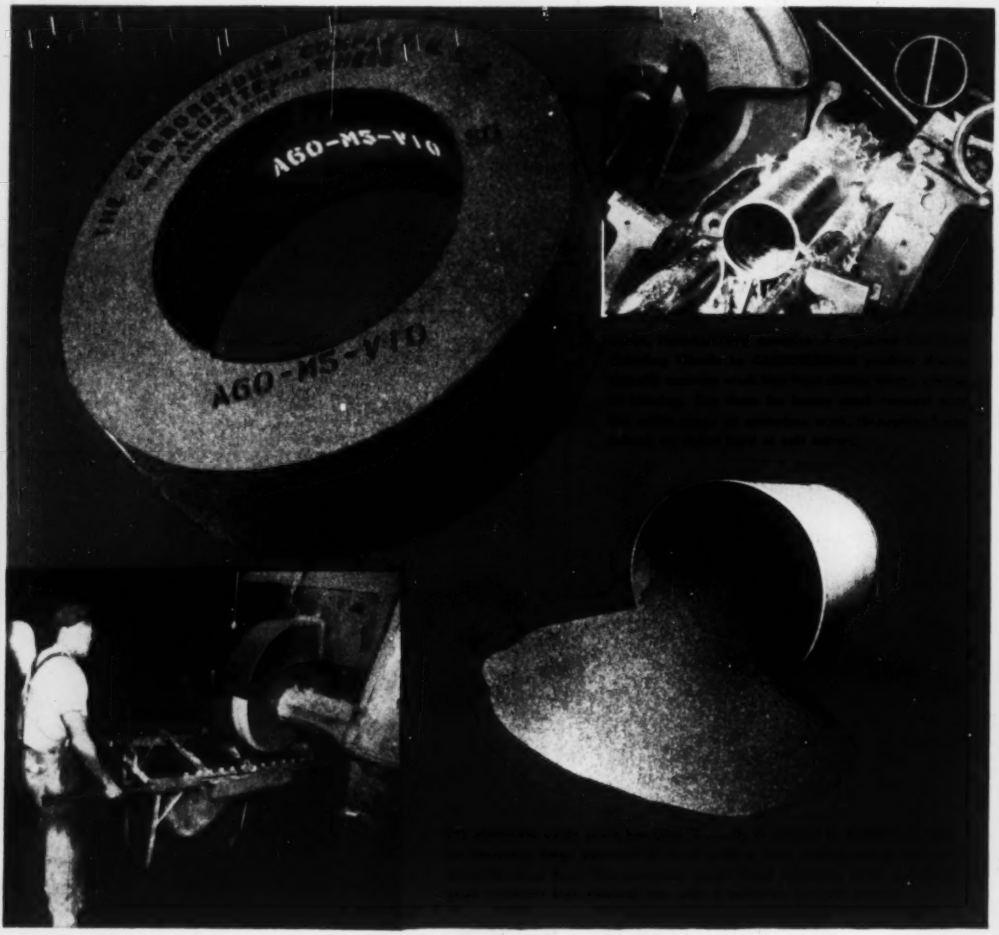
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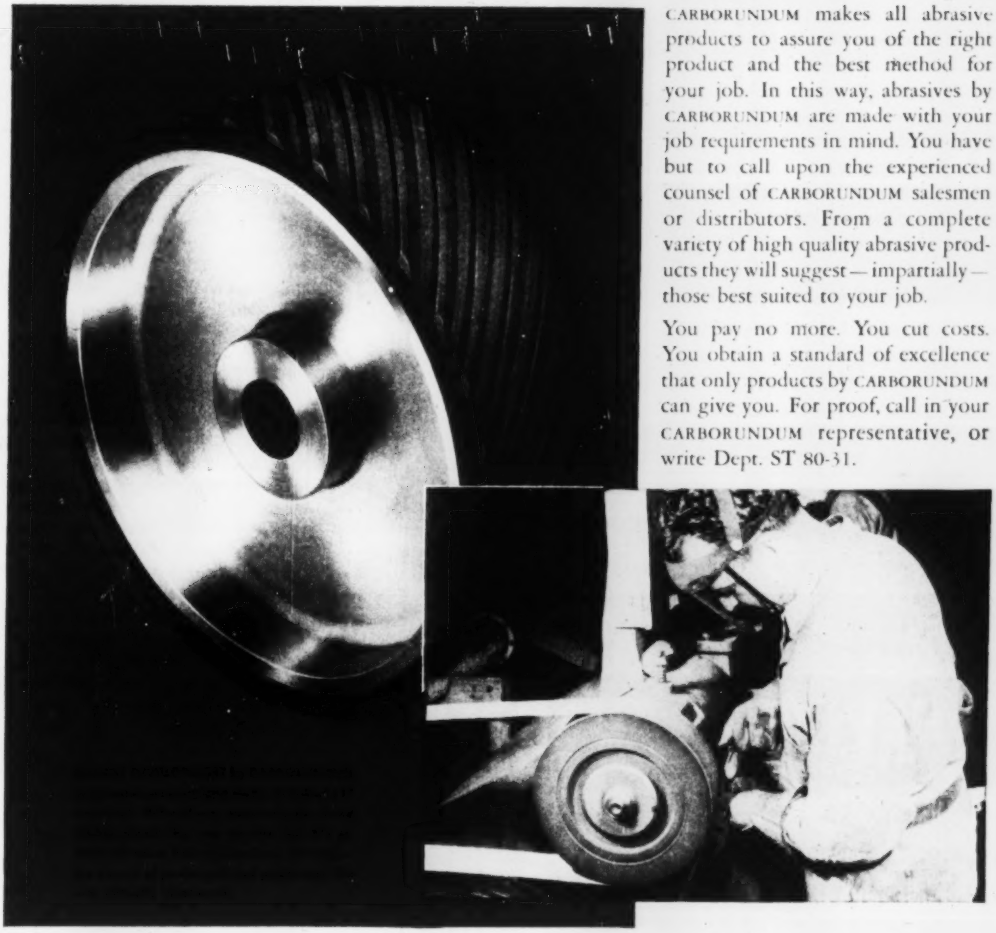

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pick-up of x-ray images, photoelectric scanning of magnetic particle indications, one minute radiography with the Polaroid camera and the metallurgist's role in the interpretation of non-destructive tests. Symposia were held on testing of ordnance material and on the inspection of jet engine parts by ultrasonic, fluorescent penetrant, magnetic particle and radiographic methods.

"The society is endeavoring for the first time to set up two technical committees—one on the subject of radioactive isotopes and their application to industrial radiography and the other on jet engine component testing procedures and evaluations."

Mr. Doane:

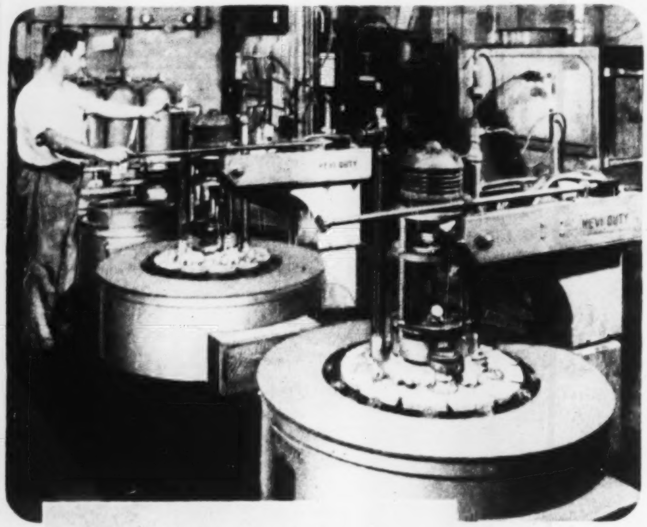
"THREE purposes stimulate the present wide and increasing uses of non-destructive testing: 1. Cost reduction by process control inspection; 2. production of the required highest quality in precision military and civilian products; 3. preventive maintenance with increasing effectiveness.

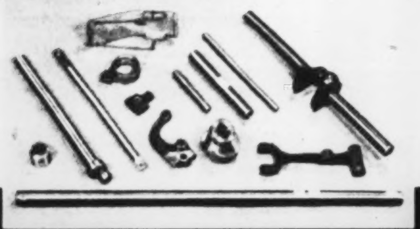
"Nondestructive testing with Magnaflux, Zyglo, radiography, ultrasonics or other methods is an accepted part of manufacturing, with benefits recognized by management, production, engineering, and of course inspection. Though not widely true ten years ago, the 'coming of age' of this inspection has been earned.

"Process control inspection is the

NOAH A. KAHN

chief metallurgist New York Naval Shipyard, Brooklyn, N. Y.





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Walter Weinwurm, chief metallurgist at Union Special, says "Our Hevi Duty furnaces do an exceptionally good job of heat treating precision parts. The work comes out of the furnaces clean with no scale or oxidation."

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most spectacular use to reduce manufacturing costs. When defects are located as they occur in manufacture, neither machine time nor manhours are wasted on defective material. Primary processes are controlled so that only parts of acceptable quality are produced at an economical quality level. As dictated by the need, a process control inspection may be on a sampling basis, or may be a 100 per cent screening inspection with automatic inspection equipment testing thousands of parts per hour.

"For highest quality products, or parts used in most critical places such as jet engine blading, not one defective part can be allowed per thousand. Repetitive 100 per cent inspection is used throughout the processing and after the final test operation. Automatic high speed units are increasingly used here to cut man-hour inspection costs to fractions of cents per part.

"Planned preventive maintenance programs are now practiced in manufacturing plants, as well as in truck, aircraft, or railroad overhaul. Nondestructive testing is increasingly becoming an integral part of plant maintenance. This locates any fatigue cracks or overload cracks from service, so that defective parts can be repaired before being put back in service."

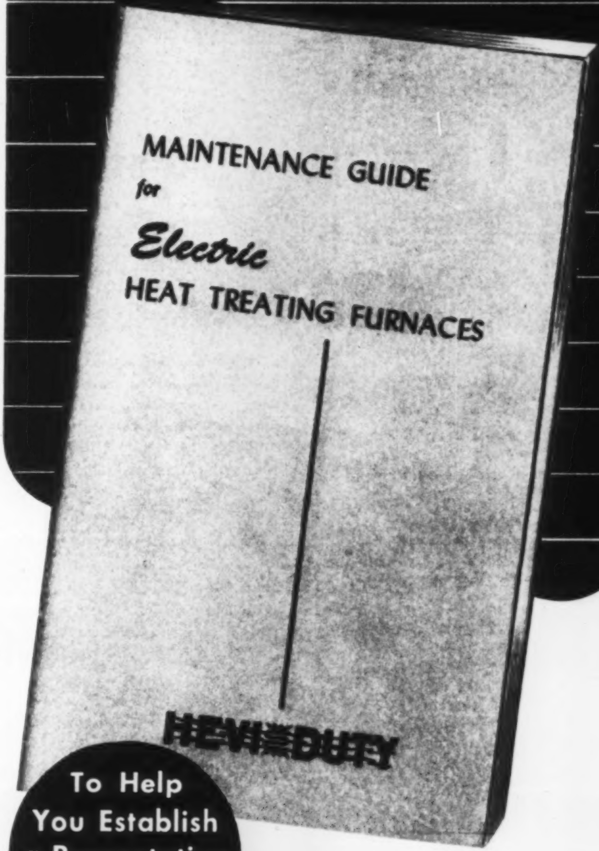
Mr. McCoy:

"IN most industrial plants electricity is the chief source of power, requiring many transformers con-

F. B. DOANE

president, Magnaflux Corp., Chicago

"An Ounce of Prevention" . . .



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taining oil in quantities from a few to several thousand gallons each. A large part of transformer maintenance is proper care of transformer oil. With production often on a 24-hour basis, it becomes impossible to remove transformers from service for oil main-

"A complete, automatic system for purifying, dehydrating, and deaerating insulating oil either in the field or at central stations has been developed so that it is unnecessary to de-energize the transformer. The oil is recirculated directly from the transformer through the unit and returned to the transformer. No blotter press equipment is required since complete dehydration is accomplished."

Mr. Johnson:

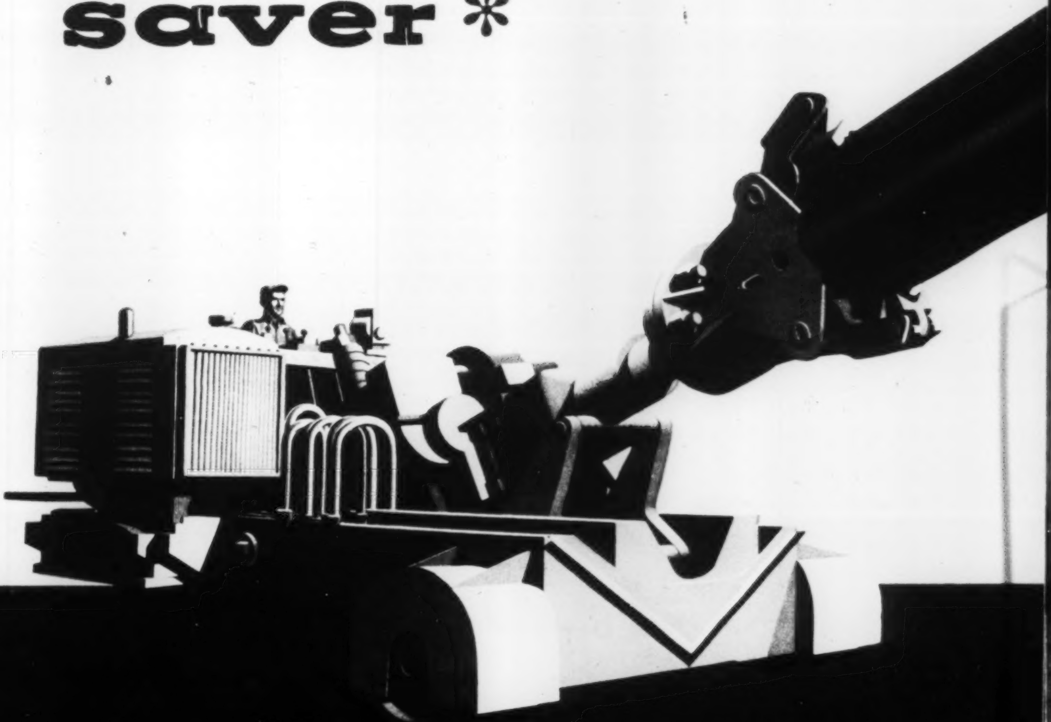
"IN recent years more and more emphasis has been placed on the dynamic balancing of rotating parts. This is becoming an increasingly important part of 'quality control' in rotating mechanisms. Vibrations produced by rotating parts that are not balanced cause excessive bearing wear, make for noisy operation of the equipment, may cause failure of structural parts of the equipment, reduce the overall mechanical efficiency of the machine and provide the small amount of energy required to incite and maintain resonant vibrations of parts of the associated machine.

"The checking and double-checking of material quality for size and surface quality is of little val-

J. R. McCOY

technical service manager, Henan-Crane Corp., Lebanon, Ind.

space-saver *



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Critical alloys can be recovered from segregated alloy scrap in the melting process, thus conserving strategic materials and increasing the supply of alloy steels, including nickel-bearing stainless. These alloys would otherwise be wasted because certain types of steel do not require their use. Also, the presence of some alloys in scrap metals can be ruinous to a heat by changing the analysis from that which is desired. And, any tin or lead not removed from scrap would be dangerous to the furnace because they attack the bottom and burn right through, thus throwing vital equipment out of production until repairs can be made.

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Washington Steel Corporation
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Alloy Steel Scrap—Segregated and Identified—Brings Premium Prices!

ue if the rotating unit is not in balance, because a rough operating unit still is not satisfactory. Tremendous advances have been made by the use of balancing machines that measure and locate unbalance by electronic means. Much more accurate results are now obtainable as well as greatly increased productivity from the machines. It is now possible to measure vibrations in the order of millionths of an inch, and to clearly indicate the amount and position at which corrections must be made.

"The field of balancing seems to be barely scratched, and parts the size of tiny giro-rotors weighing only a few ounces, up to ship reduction gears weighing more than sixty tons are now being balanced. This comparatively new type of equipment has been extremely successful in reducing vibration and consequent wear."

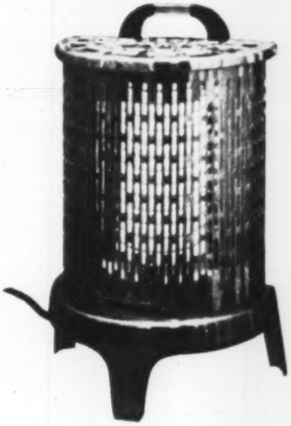
"BEGINNING with World War II and continuing through the post war years, with no curtailment in sight, the steel industry has had to meet staggering demands in production of steel products. This has been in normal production for domestic and export use but intensified by the defense plan for the noncommunist world.

"Plant equipment has had to meet the increased production from increased speeds, increased loads and overloading, harder and tough-

GEORGE H. JOHNSON

president, Gisholt Machine Co., Madison, Wis.

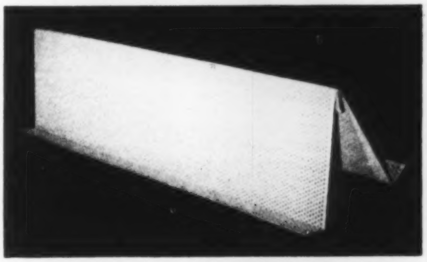
Product Designers are making wide use of Hendrick Perforated Metal



The Hendrick Perforated Metal in this Wesix Electric Heater affords strong, rigid construction; protection of the heating coil, without interfering with radiation of heat; economical production; and attractive appearance.

It is a typical example of the excellent use of perforated metal that is being made by product designers.

In industrial fields there are hundreds of applications where Hendrick Perforated Metal gives the most efficient results with maximum service life.



This book display rack illustrates how product designers are finding a continually widening range of uses for Hendrick Perforated Metal, especially where an attractive appearance, strength without undue weight, and economical production costs, are all important factors.

We shall be glad to recommend the type of perforated metal best suited for use with any particular product.

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are your best buy!

exclusive inverting design renders constant free flowing dry chemical, assuring faster, more effective and complete discharge

These fast, positive fire killers are easy to operate, compact, well balanced and offer extensive maneuverability indoors or outdoors . . . no extra gadgets protruding or complicated operating parts. The outstanding mechanical breakage feature of C-O-TWO Dry Chemical Type Fire Extinguishers, plus continuous inert gas pressured agitation or fluffing, together with a skillfully blended free flowing dry chemical, guarantee lasting, foolproof fire protection. All sizes are rechargeable on-the-scene by anyone . . . no special tools required.

C-O-TWO Dry Chemical is a finely pulverized powder . . . non conducting, non-corrosive, non-abrasive, non freezing and non-toxic . . . special compound consists of sodium bicarbonate and other chemicals skillfully blended to render high fire extinguishing qualities, remain free flowing while being used and withstand long periods of storage without deterioration. When brought into contact with fire, C-O-TWO Dry Chemical absorbs a greater part of the heat, decomposes and releases fire killing gases. This heat absorption process acts as an insulating screen between the fire and the fire fighter.

Fully approved and built to rigid specifications . . . C-O-TWO Dry Chemical Type Fire Extinguishers are exceedingly effective on flammable liquid, gas and electrical fires, as well as surface fires involving ordinary combustible materials . . . rated by Underwriters' Laboratories, Inc. and Factory Mutual Laboratories for class B and C fires.

Convenient 4, 20 and 30 pound hand sizes . . . no syphon tubes or valves within the cylinder to become clogged or inoperative . . . discharge hose and squeeze type discharge nozale remain empty until actuation takes place . . . one piece removable top assembly.

Also, convenient 150 pound wheeled size . . . sturdy, wide-faced wheels . . . discharge hose and two position discharge nozzle having soft or solid stream fully enclosed in protection casing . . . footrail and dual bar handle provide easy inverting.

Act now for complete free information on these top quality fire extinguishers. Remember . . . you can't put fire off . . . fire doesn't wait. Get all the pertinent facts . . . write today!

C-O-TWO FIRE EQUIPMENT COMPANY
NEWARK 1 • NEW JERSEY

Sales and Service in the Principal Cities of United States and Canada
Affiliated with Pyrene Manufacturing Company

MANUFACTURERS OF APPROVED FIRE PROTECTION EQUIPMENT
Squeez-Grip Carbon Dioxide Type Fire Extinguishers • Dry Chemical Type Fire Extinguishers
Built-In High Pressure and Low Pressure Carbon Dioxide Type Fire Extinguishing Systems
Built-In Smoke and Heat Fire Detecting Systems

er materials to roll, more rigid specifications, higher quality finish, inadequate time for proper maintenance and other factors contributing to excessive wear of bearings, gearing and other parts dependent on lubrication for protection against wear and continuity of service.

"Leaded compounds with unusual characteristics of adhesiveness, stability, repellence of water and enduring film strength to 50,000 psi and greater by Timken testing machine are now available. In the most severe requirements and from ample service for final judgment, these products have fulfilled the need and curtailed the necessity for engineering design replacements and mechanical improvements. In some cases, the particular parts subject to excessive wear have been isolated from the lubricating systems provided, and the lubricant applied as individual splash or bath methods."

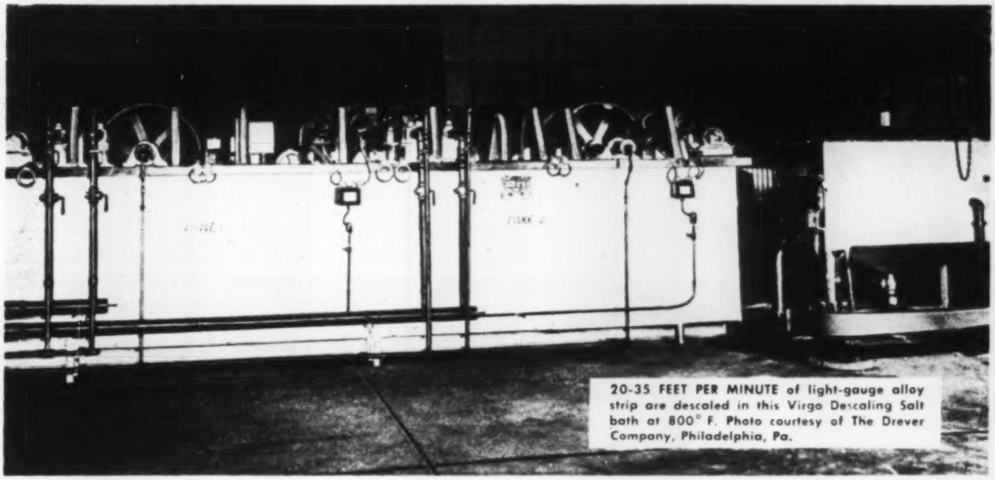
Mr. Denison:

"THE 1952 outook for the hydraulic industry is bright as there is a rapidly growing all-industry recognition of what is possible production-wise through the application of hydraulic principles. Many new secret weapons are made possible to a great extent by use of new and improved scientific inventions in hydraulics.

"Less use of centralized power systems is creating a bigger demand for packaged units—hydraul-

JOSEPH A. RIGBY

vice president, engineering & sales, Brooks Oil Co., Pittsburgh



20-35 FEET PER MINUTE of light-gauge alloy strip are descaled in this Virgo Descaling Salt bath at 800° F. Photo courtesy of The Drever Company, Philadelphia, Pa.

HOW TO

DESCALE 5½ MILES OF STRIP PER DAY

You can get clean bright surface in ONE operation with VIRGO® DESCALING SALT

Straight chrome and chrome nickel strip flow through this continuous descaling-annealing unit, at 25-35 feet per minute—about 5½ miles per 24 hour day.

The light gauge strip is descaled in one pass through a bath of molten Virgo Descaling Salt at 800° F., after annealing. The process yields a chemically clean, bright surface with no pitting, etching or metal loss.

Large or small, your plant can show real production-time savings with the Hooker Process using Virgo Descaling Salt, or with the Virgo Molten Cleaner process. Use these processes on stainless and alloy steels; castings; forgings; fabricated parts; material to be salvaged. Both processes are non-electrolytic . . . non-toxic . . . employ simple equipment . . . do not require close supervision . . . are easily adapted to your production methods. For full details, mail coupon or write us today.

For Fast, Safe, Low-Cost DESCALING

VIRGO® DESCALING SALT—Producers and fabricators of stainless and alloy steels use Virgo® Descaling Salt to quickly remove scale produced by hot rolling, forging, extruding, casting, annealing.

VIRGO® MOLTEN CLEANER Quickly, positively desands and degraphitizes castings; removes grease, dirt, chemicals, paint, enamel, rubber atmospheric corrosion and other impurities.

BOTH HOOKER PROCESSES are backed by 15 years' experience in salt bath descaling and cleaning. Engineering, research and on site operating assistance are part of our service.

SEND FOR THESE BULLETINS

They tell the whole story on Virgo Descaling Salt and Virgo Molten Cleaner—what they are, how they work, their advantages, equipment involved, and the Hooker services you enjoy as a user of the process.

Hooker Electrochemical Company
19 FORTY-SEVENTH ST., NIAGARA FALLS, N. Y.

Please send me Bulletins checked: Virgo Descaling Salt ☐
Virgo Molten Cleaner ☐

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TITLE ____________________

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COMPANY ____________________

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From the Salt of the Earth

HOOKER ELECTROCHEMICAL COMPANY
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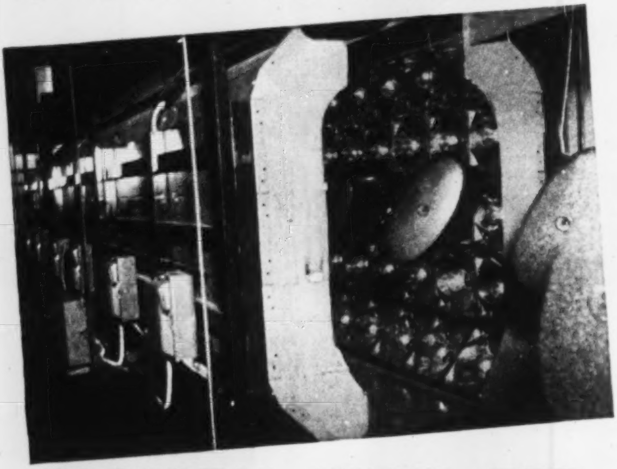
TACOMA, WASH.

Golden Opportunity

TO PUT THE HEAT ON YOUR PRODUCT FINISHING



FOSTORIA INFRA-RED

MOST EFFICIENT OF ALL INDUSTRIAL OVENS

Cuts Unit Costs

Substantially reduces all operating cost factors. Lowest "per piece" production expense.

Speeds Production

Fastest of all baking methods. Ideal for conveyorized operations.

Saves Floor Space

Smaller oven because of high efficiency. Also easily suspended from ceiling to save entire floor space.

Saves Manhours

Easily turns out more pieces per day with fewer people.

In industry from coast to coast, Fostoria "Golden Wall" Infra-red is the new high standard for finish baking efficiency. Typical of many thousands of cost-saving Fostoria installations is the oven, pictured above, used by Tropic-Aire Co. (Div. McGraw Electric), for baking white and color wrinkle finishes on electric heaters, roasters, etc. *Baking time is only 10 minutes.* This oven is ceiling mounted, saving considerable floor space.

The high efficiency of Fostoria **ovens** over any other Infra-red **equipment** or other heating methods **is the** result of such vital and **exclusive** features as the Fostoria **Golden Wall** with Evenray reflec**tors which give** greater produc**tive use of energy** than any other **equipment. Modern** equipment is **the way to cut your** unit produc**tion costs.**

ONLY WITH

FOSTORIA

Golden Wall INFRA-RED

- Highest productive utilization of energy — lowest energy loss.
- Uniform heat distribution to all product surfaces.
- Instantaneous heat, instantly controlled — no stand-by time — no overheating.
- Lowest unit production cost and finest, most durable finishes.

Listed by Underwriters' Laboratories, Inc.

WRITE FOR COMPLETE FACTS

Send for this brochure of technical facts on Infra-red with case histories of many installations. Tell us about your particular problem.

THE FOSTORIA
PRESSED STEEL
CORPORATION
FOSTORIA, OHIO

Oldest and Largest Manufacturers of Industrial Infra-red Ovens.

ic pumping units for individual application or completely packaged circuits of pipeless design with valving integral with the main structure. These self-contained units are more compact and insure better service.

"Improved controls for decompression and for the reduction of noise and pulsation in hydraulic components operating under high pressure is increasing the use of higher pressure circuits. Advancement in hydraulic fluids, lubricating principles and oil seals further contribute to this transition and demand for equipment modernization. The science of hydraulics has made such forward strides in recent months that the industrial engineer can hardly afford to overlook its possibilities, regardless of his industry, or whether he is planning a single custom built setup or is an original equipment manufacturer."

"IN the steel industry, as in practically every phase of manufacturing, petroleum products play an important part. Petroleum fuels supply the energy electric power, as well as for heating various types of furnaces necessary to produce and treat steel. Petroleum lubricants make it possible for industrial machinery to operate smoothly, efficiently and at maximum capacity.

"Constant progress in processing equipment and methods has brought changing demands in pe-

W. C. DENISON JR.

president and general mgr., Denison Engineering Co., Columbus, O.

SELL YOUR BRASS MILL SCRAP PROMPTLY

To keep production rolling

Help lick the shortage of brass and copper. Make sure that every pile of brass mill scrap in your factory – even if it is only a hundred pounds – is sold at once.

Not only is this scrap immediately salable on today's market – it will bring vital metal to the production lines where it is sorely needed.

Both the defense program and civilian needs require more and more copper and brass. To prevent increased shortages and even more stringent regulations, see that *your* brass mill scrap is moved promptly.

Chase ® BRASS & COPPER

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for
dependable hardenability with maximum properties in low alloy boron steels

USE *Grainal* ALLOYS

For boron-treated steels, whether made in the electric furnace or in the open hearth, Grainal alloys are used successfully to increase hardenability.

A larger quantity of Grainal is usually required in electric furnace practice because of the higher nitrogen content characteristic of steels produced by this method. The conversion of the nitrogen content of the steel to an ineffective compound, as is done by some of the components of Grainal, permits a minimum amount of boron to produce the desired effects.

Grainal alloys are metallurgically balanced so that the larger additions required by electric furnace steels can be made safely without exceeding the boron limit for hot shortness.

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420 LEXINGTON AVENUE · NEW YORK 17, N. Y. · DETROIT · CHICAGO · CLEVELAND · PITTSBURGH

MAKERS OF ALLOYS
VANCORAM
CHEMICALS AND METALS

troleum lubricants. These demands have been met by petroleum technologists with new and improved lubricants achieved through improved refining methods and invention of various types of addition agents. New and more effective devices for applying lubricants also have been developed.

"This progress, however, cannot be fully utilized unless good, sound lubrication engineering principles are practiced. Lubrication engineering is the science governing the selection and application of lubricants, or in practical terms, the right amount of the right lubricant in the right place at the right time. The wrong lubricant, regardless of its quality, for a given application will cause nothing but trouble and even the right lubricant if applied by means of ineffective applicators may be hazardous and wasteful.

"In these days when steel is so important, the role of lubrication engineering in maintaining full and uninterrupted production of steelmaking and processing equipment should not be overlooked."

Mr. Bastian:

"THREE applications of oil products in the metalworking field have gained considerable prominence, show promise of further growth.

"Hot oil quenching is particularly of interest in heat treating automotive gears and other parts to improve production and service characteristics of treated pieces.

"Heavy duty soluble oil emul-

JOHN P. CRITCHLOW

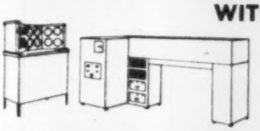
chief fuels & lubricants engr., Gulf Oil Corp., Pittsburgh

BAIRD ASSOCIATES-DOW DIRECT-READING SPECTROMETER

for analysis of
IRON
STEEL
BRASS
MAGNESIUM
ALUMINUM

PUSH-BUTTON ANALYSIS
CUTS COSTS and
SPEEDS PRODUCTION

WITHIN FORTY SECONDS after a heat sample is placed in the Direct-reading Spectrometer, an accurate quantitative analysis is completed and on its way back to the melt shop.



THE UNPRECEDENTED CLOSE CONTROL of the molten bath, made possible by this exceptionally rapid analysis, cuts costs for leading producers of alloys. It assures uniformity of output . . . with a marked increase in productivity. And the simple, push-button operation of the Direct-reading Spectrometer saves valuable engineering time and facilities in complex analyses—eliminates human error.

SPECTROSCOPY IS MECHANIZED on this operating principle. When the sample is arced or sparked, electron photomultiplier tubes, stationed at the proper wavelength intervals, are exposed to the individual spectrum lines of each of the elements to be determined. Each phototube charges a condenser to a voltage proportional to the concentration of the element. This voltage is indicated on dials calibrated in percentage concentration for each element. The entire process is automatic, starting at the touch of a button and finishing in less than a minute.

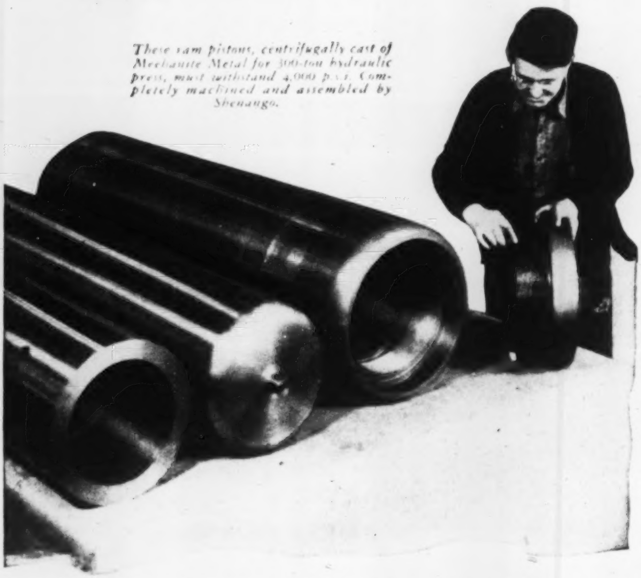
PUSH-BUTTON ANALYSIS CAN CUT COSTS FOR YOU, TOO

A conference with a Baird Associates engineer will be arranged at your request.

Baird Associates, Inc.

33 UNIVERSITY ROAD CAMBRIDGE 38, MASS.

SHENANGO *Centrifugal* CASTINGS ... KEY TO SAVINGS



These ram pistons, centrifugally cast of Meehanite Metal for 300-ton hydraulic press, must withstand 4,000 p.s.i. Completely machined and assembled by Shenango.

Teamed up for longer life under pressure

SHENANGO CENTRIFUGAL CASTINGS OF MEEHANITE METAL

FOR pressure service . . . for almost *any* severe service . . . it's hard to match Shenango *centrifugally* cast Meehanite Metal.

First, Shenango's centrifugal process means a uniform, high-strength, pressure-dense casting, free from sand inclusions, blow holes and other defects. Next, in Meehanite Metal you have finer graphite flakes, always more evenly dispersed, thus avoiding stress concentrations and permitting a finer finish.

So here's a combination you just can't beat for wear-life . . . for resistance to abrasion, pressure or shock . . . for long-range *economy!*

If *your* plans call for essentially symmetrical parts, large or small, rough, semi- or finish-machined, check with Shenango. Get *all* the facts! Informative bulletins are yours for the asking.

SHENANGO-PENN MOLD COMPANY
Dover, Ohio
Executive Offices. Pittsburgh, Pa.

SHENANGO

ALL RED BRONZES · MANGANESE BRONZES · ALUMINUM BRONZES
MONEL METAL · NI-RESIST · MEEHANITE METAL

sions have in many cases replaced expensive compounded cutting oils heretofore considered essential for the cutting job. Typical are bolt threading and broaching of steel.

"Use of dual purpose cutting oils solves many shop operating and cost problems, particularly where machine bearings allow leakage of spindle oil into the cutting oil sump, or where in the interest of simplified handling, the number of lubricants in the shop must be kept to a bare minimum."

"SIMPLIFICATION in number of industrial lubricants is now recognized as essential to efficient operation of a manufacturing plant. Terminology used in describing oils and absence of definite yardsticks are the chief impediments to simplification.

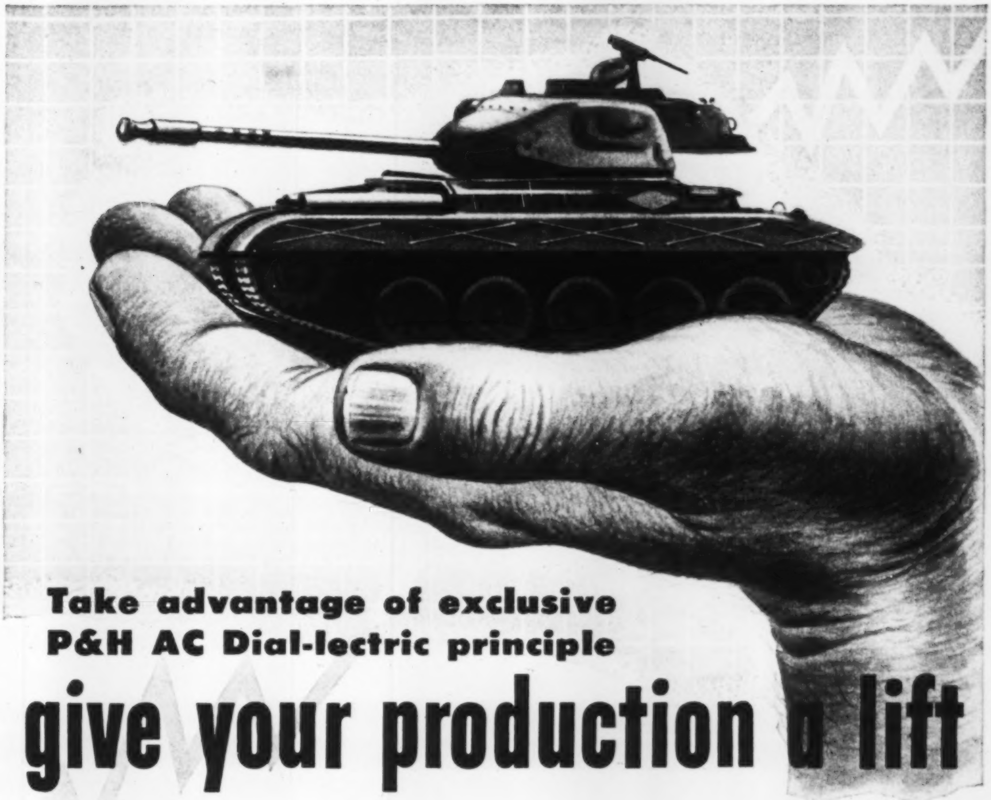
"With many individuals and groups working toward solution of this problem, it is reasonably certain that, in the immediate future, the combination of ideas will result in a practical, understandable method of simplification. Various schemes are now being used and it only takes an authoritative technical society such as American Society of Lubricating Engineers to consolidate them.

"Such a method should provide a scale understood by the machinery maker, machinery user and the lubricant supplier. It can give them all a common language.

"The lubricant supplier now is

E. L. H. BASTIAN

sr. eng., lubrications dept., Shell Oil Co. Inc., New York



Take advantage of exclusive P&H AC Dial-lectric principle

give your production a lift

— with safe, open-circuit voltage . . . easy, quick-start arc . . . time-saving, built-in remote control . . . compact AC design

Armor plate welding calls for low-hydrogen or stainless steel electrodes. P&H, pioneer in the low-hydrogen field, also offers the AC welder that gives you the best weldability with these rods — for greater production.

Your men like the P&H AC Dial-lectric — like its safety under the most adverse conditions; like the easy, quick-start arc, the elimination of arc-blow. And they get more done! Get sounder, better looking welds in less time, thanks to built-in remote control which lets them select the right heat at the work, turns *walking time* into *welding time.*

Because these welders give production such a lift, P&H has stepped up its delivery schedules to meet defense demands without delay. Get your production rolling in high gear. Order your P&H AC Welders today. Capacities up to 650 amps. Take advantage of this delivery situation while it lasts.

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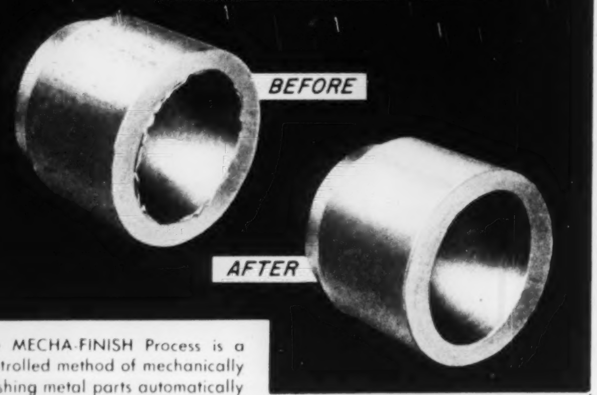
A.C. ARC WELDER

P&H WELDING DIVISION
4411 W. National • Milwaukee 14, Wis.
HARNISCHFEGER CORPORATION

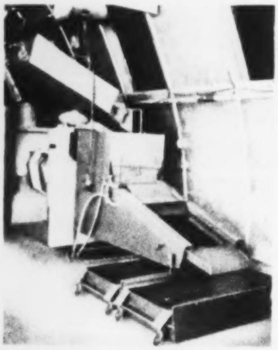
2350

SAVE MONEY TODAY
THE MECHA-FINISH WAY



The MECHA-FINISH Process is a controlled method of mechanically finishing metal parts automatically without the aid of hand work. It successfully deburrs, grinds and polishes a wide range of metal parts and does work that cannot be done by manual methods. The MECHA-FINISH Process results in:

- LOWER COST
- A UNIFORM PRODUCT
- SAVINGS IN MAN HOURS
- FEWER REJECTS
- INCREASED PRODUCTION



SSI STATIONARY SEPARATOR SEPARATES PARTS FROM ABRASIVE CHIPS

The MECHA-FINISH Process has been installed by many of the Nation's Top Manufacturers. It has proved to be the fastest method of doing high-precision and uniform work at the lowest cost.

It is our responsibility to prove our process to you without obligation. Write or call us today for a free demonstration of the MECHA-FINISH Process.

MECHA FINISH CORPORATION

MECHA-FINISH CORPORATION
P. O. BOX 308 STURGIS, MICHIGAN PHONE 388

caught on one hand by machinery manufacturers' recommendations which often are not practical for plant use. On the other hand, the machinery user often insists on using either the exact or equivalent product mentioned by the maker. The oil company, as a consequence, supplies the machinery user many more lubricants than necessary for efficient operation.

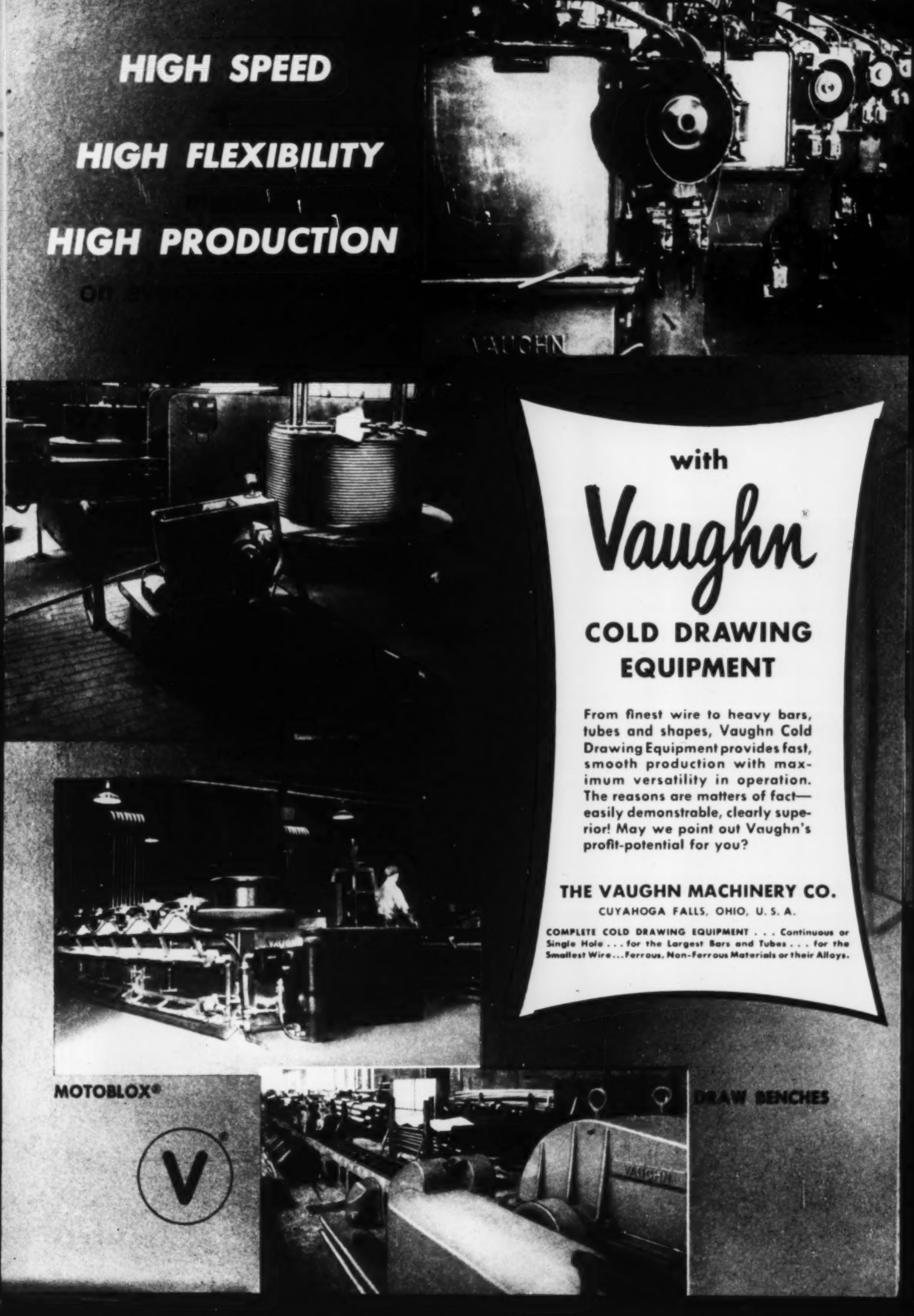
"This multiplicity of lubricants, not only complicates plant operation, but also presents a difficult marketing problem for suppliers. There are always odds and ends of lubricants different from the regular line required. Special refining, handling, shipping and marketing interfere with the even flow of large volume items more essential to the civilian economy and the armed forces. A practical, workable, easily understood yardstick would not only help the lubricant supplier but also all consumers."

Mr. Reitze:

"RESEARCH and development work is continuing in the field of metalworking lubricants. The increased tempo of the defense industries has placed new emphasis on the need for improved metalworking lubricants. New alloy materials and machining operations are requiring increasingly higher quality characteristics.

"A new type of extreme pressure soluble oil is becoming more widely used. It provides economies in many operations because

JAMES G. O'NEILL JR.
staff engineer, Sinclair Refining Co., New York



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From finest wire to heavy bars, tubes and shapes, Vaughn Cold Drawing Equipment provides fast, smooth production with maximum versatility in operation. The reasons are matters of fact—easily demonstrable, clearly superior! May we point out Vaughn's profit-potential for you?

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DRAW BENCHES

it gives longer tool life than compounded mineral oils.

"Cold extrusion of cartridge cases and shells has been made possible by the use of chemical coatings and new types of drawing compounds. Additional development work is continuing.

"Effectiveness of mineral oil type rust preventives has been greatly increased due to the development of new types of additives. The development of nonflammable hydraulic oils for die casting and forging machines as well as for other machines located near hot metal operations or open fires is progressing, although some of these products are quite expensive for commercial use. Use of extreme pressure additives in wire rope stranding lubricants has greatly increased the field life of these materials."

WILBUR J. RIETZE, Esso Standard Oil Co., New York.

"SCARCITY of manpower in industry has resulted in so much upgrading that if materials are to be moved or stored, it must be done mechanically. Cost of manpower, including the dividends of social betterment and security guarantees, has multiplied far more rapidly than that of equipment for performing the tasks labor considers unattractive. Demand for mobile materials handling equipment more than doubled in 1951 over 1950.

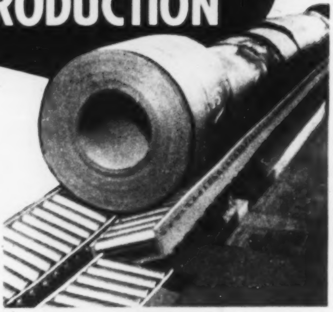
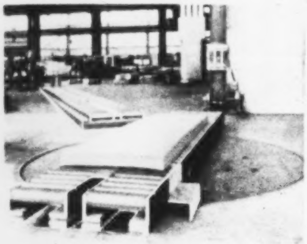
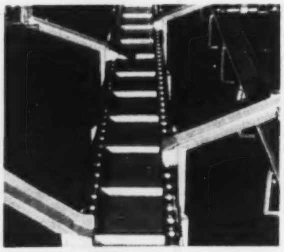
"Calls are now coming from smaller plants where one to two men performing the material handling function are an important part of the production scheme. Larger inventories made necessary by orders in hand, fear of unavailability and interference with normal deliveries have brought about a scarcity of storage and production space. This has driven management to the utilization of every cubic foot available. Lack of protected space and the materials and labor to provide it has resulted in the development of many ingenious plans and machines.

"For the basic 'muscle unit' trucks, tractors and cranes available, a practically unlimited number of attachments have been designed to substitute for the functions of hand and brain combined.

"The power industrial truck industry sees today no limit to the demand for its product. In 20 years it has moved from a $5 million to a $150 million dollar business."

C. B. COOK

vice president, Ellwell-Parker Electric Co., Cleveland

1952 TECHNIQUES THAT SPEED PRODUCTION

COILS OF STEEL weighing as much as 30,000 pounds — are handled quickly in a large eastern steel mill on this A-F Engineered Completely Coordinated Conveying System. An A-F Tilter discharges coils automatically from conveyor. Many other features speed up work of stacking and distributing sheets.

THIS A-F ROLLER CONVEYOR mounted on a powered turn-table distributes stacked sheet steel to the many work bays in this modern steel plant — easier and faster.

For information regarding latest, most efficient methods of handling metal products, coils of steel, stacked sheet steel and metal scrap salvage—write today.

FOR EFFICIENT SCRAP HANDLING
An A-F Pan Type Overlapping Beaded Apron Conveyor takes scrap (via slides) directly from stamping presses and conveys it to a long A-F Reversing Conveyor of similar construction which discharges scrap into either railroad cars at one end or trucks at the other.

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570 Disney St. Established 1901 Cincinnati 9, Ohio
Offices or Representatives in Principal Cities

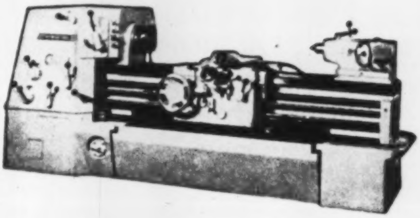
CONVEYING EQUIPMENT
CONVEYING A F MACHINERY
Alvey-Ferguson
WASHING MACHINES FOR INDUSTRY

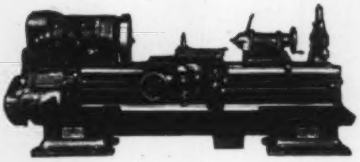
REPLACE With SPRINGFIELD LATHES

handle a wider range of work—

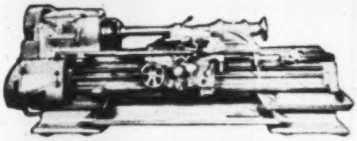
increase output—

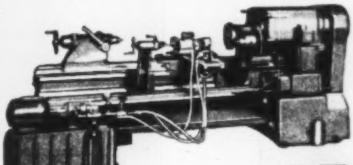
lower operating costs

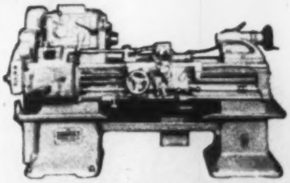




TURNING
CONTOURING
PROFILING
ENGRAVING
REPRODUCING
BORING
THREAD CHASING
RELIEVING







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Specify Chandler fasteners for dependable performance in automotive equipment. Chandler is famous for high quality connecting rod, main bearing, cylinder head, fly wheel, transmission and other bolts essential to this industry.

Despite the forces continually exerted by vibration and stress, Chandler fasteners firmly hold each component in position. Whatever your needs, specify Chandler high quality cold wrought metal fasteners.

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Chandler Products Corp.

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1951 IN REVIEW

WHEN IT HAPPENED

JANUARY

Jan. 2—Special House subcommittee investigating monopolistic practices in the steel industry files a report containing no recommendations for legislation.

President Truman signs bill forbidding a company from buying assets of another if result is to lessen competition substantially.

NPA orders cobalt put under complete allocation program beginning in February.

Use of copper in about 300 nonessential civilian products is banned by NPA, effective March 1.

National Plans Eastern Plant

Jan. 3—National Steel buys 2000 acres of land on deep water of the Delaware river near Camden, N. J., says it will build an integrated steel plant to supply eastern demand.

New England Steel Development Corp. requests authority to build a $250 million integrated steel plant at New London, Conn.—annual capacity to be 1 million tons.

President Truman signs a new tax bill, placing regular corporate taxes at 47 per cent and the excess profits rate at 77 per cent.

Pittsburgh Steel announces an expansion program that will raise production 50 per cent and get the company into the flat-rolled products field.

NPA says it will create a national iron and steel scrap pool to make allocations to customers as needed.

General Electric plans to expand its Lockland, O., plant for jet engine research and production.

All-Rail Ore Shipments Started

Jan. 7—U. S. Steel initiates all-rail ore shipments from Duluth and Two Harbors, Minn., to Pittsburgh, Youngstown and Chicago district plants, says it hopes to haul 2 million tons before spring shipping season opens.

Steel Co. of Canada Ltd., announces a $45 million expansion program to increase capacity 50 per cent.

Jan. 8—Steel producers agree voluntarily to freeze prices at Jan. 5 level.

NPA Order M-20 limits inventories of iron and steel scrap.

Jan. 11—Certificate of necessity for $250 million is issued to New England Steel Development Corp., on a limited 60-day basis, for construction of a steel plant in New London, Conn., area.

Tennessee Steel Corp. organizes and applies to government for approval in building electric furnace steel plant costing about $10 million in Scott county, Tenn.

Pressed Steel Car gets a $10 million order from Army Ordnance to organize tank depot at its Hegewisch, Ill., plant.

Jan. 12—NPA issues Order M-22 to control flow of aluminum scrap. NPA appoints industry task groups to investigate, recommend tin conservation measures.

Jan. 15—American Iron & Steel Institute says annual rated steel capacity, as of Jan. 1, was 104,229,650 tons; blast furnace capacity, 72,471,780 tons.

CIO announces a drive to organize the nation's nonoperating railroad workers.

Jan. 17—General Motors lands $106 million more on its Cleveland Cadillac Tank Division contract, making total commitments $500 million.

Construction of a $3 million steel plant in Reading, Pa., is announced by Carpenter Steel.

American Car & Foundry gets a $53 million award from the Army to make motor gun carriages.

John L. Does It Again

Jan. 18—John L. Lewis and soft coal operators agree on 20 cents an hour wage increase for miners effective Feb. 1. Operators estimate soft coal price will go up 6 per cent.

Government says it will reopen two magnesium plants to raise production 222 million pounds in the next two years. Units will be run by Dow Chemical Co., at Velasco, Tex., and Kaiser Aluminum Co., at Manteca, Calif.

Chrysler receives a $99 million order from the Army to assemble tanks, Continental Motors a $100 million contract to build the engines for them.

Jan. 21—Alcoa plans alumina plant near Bauxite, Ark., that will increase the company's output nearly 50 per cent.

Jan. 22—Steel companies schedule production at 2,017,000 tons for the week. It is the first time 2 million tons were ever planned for one week.

Lone Star Steel begins construction for its East Texas integrated mill.

Jan. 23—Bethlehem Steel starts a $300 million expansion program to increase annual ingot capacity 1.6 million tons.

Cold wave cuts industrial gas use in Cleveland area about 20 per cent; in Pittsburgh the cut ranges from 50 to almost 100 per cent.

Tin price hits new high at $1.79 a pound.

NPA orders increase in amount of steel that producers must set aside for defense rated orders.

Jan. 24 — NPA restricts use of nickel to essential items.

Jan. 25—Ford awards Great Lakes Engineering Works contract to build a 647-foot ore ship, to have capacity of 19,000 gross tons.

Steel Capacity: 117.5 Million

American Iron & Steel Institute announces steel expansion plans will raise ingot capacity to 117.5 million tons by Jan. 1, 1952, says blast furnace capacity will increase to 79.3 million tons by the same date.

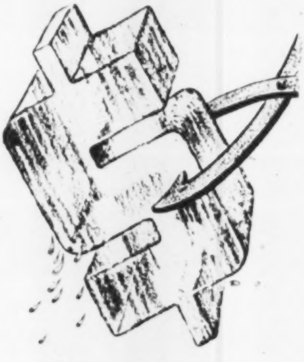
Bendix Aviation buys Ford's Hamilton, O., plant, to fill government aircraft parts contracts.

Jan. 26—Bethlehem Steel's annual report shows a record for earnings in 1950: $122,976,071 or $12.15 a share.

Jan. 27—Hard coal operators give United Mine Workers the same wage increase they got from the soft coal industry.

No. 1 heavy melting steel scrap price advances $5 a ton to $51.50 in Pittsburgh, a record high.

Jan. 29—Lukens Steel says it will cut away the hill at its Union Hill, Pa., plant to clear space for a $3 million expansion.



Wage and Price Freeze

Economic Stabilization Agency publishes its general ceiling price regulation freezing prices at highest levels in the periods Dec. 19, 1950-Jan. 25, 1951.

Jan. 30—Two finishing mills at Clairton and one at Homestead shut down because of industrial gas curtailment in Pittsburgh area.

Bureau of Mines reports 1950 ore shipments reached an estimated 97,580,000 gross tons and production hit 98,160,000 gross tons.

Jan. 31—Rail switchmen's strike started in St. Louis spreads to Chicago, affecting freight shipments throughout the midwest.

U. S. Steel reports record 1950 sales of $2,955,000,000. Net income is $215 million, profits average $7.28 a share.

Corporate Tax Boost Asked

President Truman proposes an increase in corporate taxes to 55 per cent.

FEBRUARY

Feb. 2—NPA bans use of aluminum in 200 non-essential items after April 1.

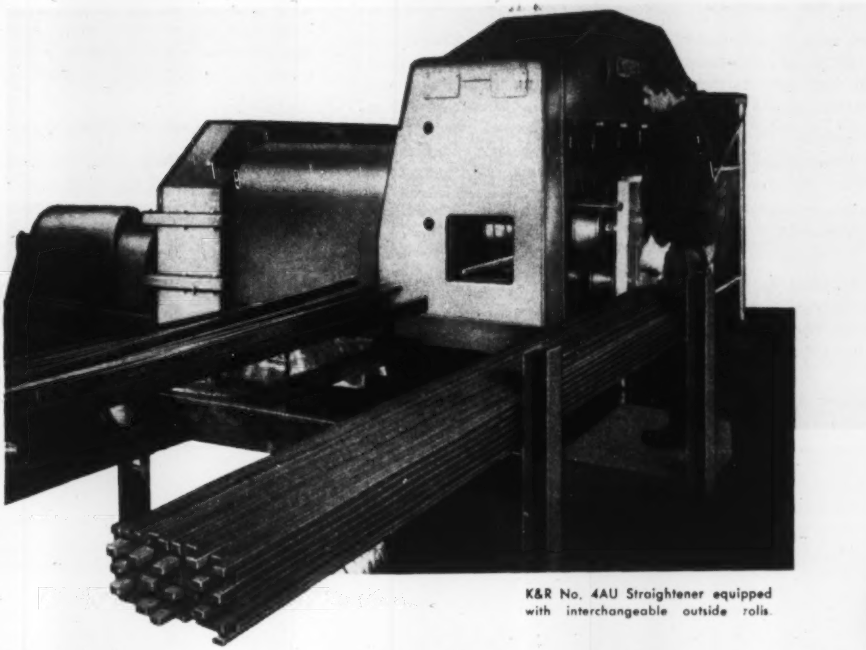
American Iron & Steel Institute reports record 1950 U. S. pig iron production of 64,589,140 net tons, exclusive of ferro-alloys.

Feb. 3 — Operations of Colorado Fuel & Iron extended to the Atlantic seaboard when company buys the capital stock of Worth Steel Corp., Claymont, Del.

OPS orders iron and steel scrap prices rolled back to December levels, effective Feb. 7. Roll-back ranges from $10 to $60 a ton.

Feb. 5—Vanadium Corp. of America says it will build a $7 million silicone alloy producing plant near New Haven, W. Va.

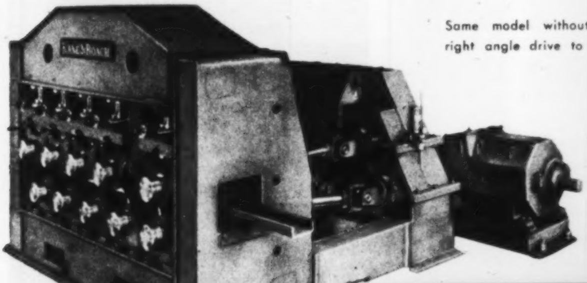
Private power companies predict facilities to produce 475 billion kwhr of electric power by 1960 after Interior Department assures them no crippling material curtailments of expansion are contemplated.



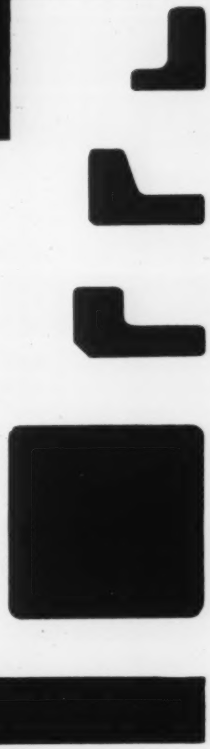
K&R No. 4AU Straightener equipped with interchangeable outside rolls.

Flexibility of this K & R Straightener gives 2-machine performance

The K&R No. 4AU Straightener, equipped with easily interchangeable *inside* rolls for heavy, and *outside* rolls for lighter work, permits the handling of a large range of sections. All rolls are quickly interchangeable. It is this *flexibility* of the Kane & Roach Straightener that gives you the performance of *two* machines. Truly double duty! In fact, one large steel company writes, *"Quality of straightening is everything you claim it to be—most happy about it. We believe you might well stress the outside roll. It has flexibility almost equivalent to a second straightening machine."* Find out how you, too, can increase production, lower straightening costs. Write for further information.



Same model without outside rolls utilizing right angle drive to decrease overall width.



Cross section views, approximately 1/3 actual size, of stainless steel sections straightened.

Manufacturers of
Bending Rolls — Straightening Rolls — Cold Roll Forming Machinery — Slitting Lines — Special Machinery

KANE & ROACH

INCORPORATED
Syracuse, New York
Established 1887

Lake Boats on the Seashore

Bethlehem Steel says it will build two lake ore boats at Sparrows Point, Md., the first lake carriers ever built outside Great Lakes yards.

Feb. 6 Inland Steel reports it will open a new iron ore mine with eventual annual production of 200,000 tons near Crystal Falls, Mich.

Weirton Steel develops an electrolytic tin plating process permitting lighter coating on one side of the sheet than on the other.

Aluminum Output: A New High

Feb. 7 Aluminum production in 1950 is announced at 1,437,255,518 pounds about 19 per cent more than in any previous year.

Feb. 8 Pittsburgh Consolidation says it will build a pilot pipeline near Cadiz, O., to carry emulsified coal. If the line succeeds, plans call for extending it to Cleveland.

American Can reveals its process for producing enameled steel containers to replace tin cans.

Shipbuilding Gets a Break

Maritime Administration places orders for 25 freighters costing $200 million.

Feb. 9 Embargo on mail service is lifted as "sick" switchmen return to work.

Defense Spending: $55 Billion

Charles E. Wilson, defense mobilization director, predicts defense spending for materials alone will be about $55 billion between Feb. 1, 1951 and Jan. 30, 1952.

Feb. 15—NPA directs increases from 2 to 25 per cent in production that steel mills must set aside for DO-rated orders.

Green River Steel Co. receives $8,356,000 from the government to build an electric furnace at Owensboro, Ky.

Morrisville Contracts Awarded

Koppers Co. and Allied Chemical receive contracts from U. S. Steel to build open hearths and coke oven batteries at Morrisville, Pa.

Kaiser Aluminum & Chemical begins building a 200 million-pound-a-year aluminum reduction plant at New Orleans at a cost of $79 million. Also planned are expansion of the Baton Rouge alumina plant and development of Jamaican bauxite ore deposits.

Feb. 16 First NPA controls are placed on lead and antimony. Inventories limited to 60 days' supply or "a practical working minimum" whichever is less.

"Sickness" Idles Switchmen

Wage formula, approved by the Wage Stabilization Board, permits many increases to 10 per cent above Jan. 15 level.

Labor members of WSB walk out in protest of the boards new formula.

Emergency order MO-2 places manganese ore under allocation control.

Buick Motor Division gets "the biggest single defense contract Buick ever received"—an order to build the J-65 Sapphire Jet engine under license from Wright Aeronautical Corp.

British iron and steel industry nationalization goes into effect.

Feb. 18 — General Electric announces plans to build a $15 million electronics plant near Utica, N. Y.

Feb. 19—Bethlehem Steel reports blast furnace it will build at Lackawanna, N. Y., will be one of the world's largest, having an estimated annual capacity of 540,000 tons.

NPA lifts ban on use of copper in water systems for new homes but places curbs on its use in 50 other items.

First AF Subcontract Clinic Open

Eastern Air Procurement District opens in New York the first of the Air Force series of subcontract clinics.

Boron Steels Make Bow

New steels, treated with the noncritical alloy containing the element boron, are introduced by the Technical Committee on Alloy Steel, AISI.

Feb. 22—Bethlehem Steel grants eastern shipyard workers an 18.5 to 23-cent-an-hour wage increase, retroactive to Jan. 1.

Munitions Board cuts rate of copper stockpiling by 50 per cent, releasing large quantities for industrial use.

Feb. 24—Amendment to M-4 eases restrictions on use of tin in cans.

Feb. 26 — Kaiser Aluminum & Chemical enters aluminum extrusion field by leasing the government's aluminum and magnesium extrusion plant at Halethorpe, Md.

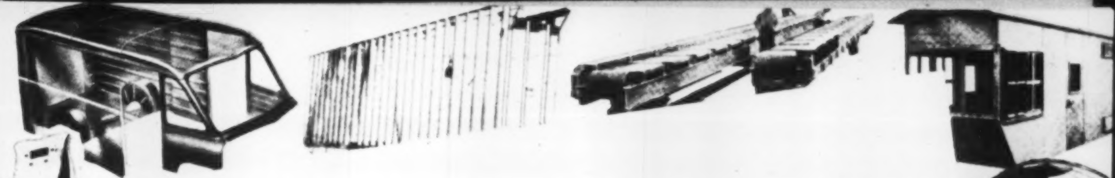
Dow Chemical awards United Engineering & Foundry contract to build continuous magnesium rolling mill at Madison, Ill.

Feb. 27—NPA issues Reg. 4, permitting all U. S. establishments to procure maintenance, repair and operating supplies according to average quarterly purchases in 1950 by exercising priority (DO-97).

NPA cuts back steel allotments to rail equipment makers to allow freight car construction at a rate of 9000 a month from the previous rate of 10,000.

Two new series of lean-alloy steels are announced by Crucible Steel Co. of America. Both are stainless and heat resisting, neither use scarce cobalt or columbium and one has nickel content of less than 1 per cent.

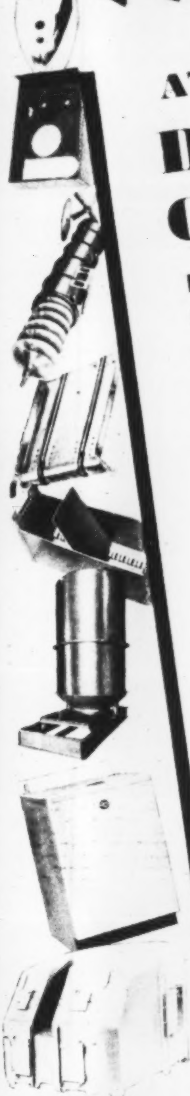
Steel Industry Technical Committee reports six steel companies are making two heats each of new



ATTENTION!

DEFENSE CONTRACTORS

Brandt mass production metal working facilities are ready to serve both government and private contractors alike. Where time is essential on completely assembled components. contractors place their orders with Brandt and forget them! You too can save when you call Brandt!



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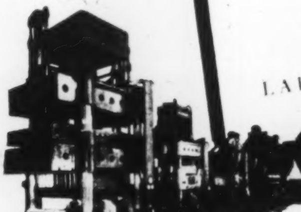
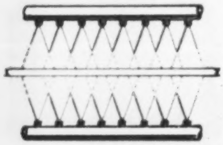


HYDRAULIC DESCALING IS FAST, CHEAP AND EFFECTIVE

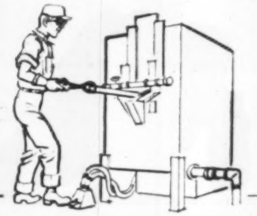
SCALE which forms when metal is heated during production can become a problem if it is not properly removed. Scale can affect the size, weight and quality of your finished product. Scale can cause unnecessary wear on your cutting tools, punches, dies and machinery.



Descaling flat stock, showing spray overlap.

Effective descaling need not be a slow, costly manual or mechanical process. With hydraulic descaling you can efficiently knock off scale with high velocity jets of water in a matter of seconds!

The heart of the hydraulic system is the pump which delivers the high pressure water. The BJ Hydropress pump is ideal for this type of work because of its unique construction features. It does not require relief valves, accumulators or extra heavy fittings and piping. Its double volute design creates inherent balance at all heads and capacities.



Typical cabinet for descaling slugs or bars.

Its vertical construction allows the use of a simple foundation and a minimum of floor space.

For more information on how BJ may solve your pumping problems, call your local BJ sales engineering office today!

BJ HYDROPRESS PUMPS ARE YOUR ANSWER

These BJ Hydropress pumps provide capacities to 300 gpm and pressures to 3000 psi. One pump can serve a number of descaling cabinets or booms.

Write for BJ Hydropress Bulletin No. 48-6400. No obligation, of course.

Byron Jackson Co.

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OFFICES IN PRINCIPAL CITIES

boron-treated lean-alloy steels for shipment to selected customers.

Feb. 28—Nickel order M-14 is amended to effect slight end-use adjustment.

NPA Orders M-40 and M-41 authorize the machine tool pool order system.

10 per Cent Wage Formula O.K.'d

Economic Stabilizer Johnston signs the 10 per cent wage formula, but recommends seven changes as concessions to labor.

MARCH

Mar. 5—Army Ordnance Dept. begins setting up contractor exhibits at 14 district offices throughout the country.

Warner & Swasey stops quoting prices on new machine tools until it can get some clarification of the price situation.

Senate Armed Services Preparedness Subcommittee says government can force current high tin prices down by a halt in stockpiling.

Mar. 6—General Services Administration announces suspension of all new purchases of tin for the national stockpile.

Ford gets $195 million contract to build medium tanks for the Army in a proposed Detroit area plant.

Mar. 7—Defense Mobilizer Wilson estimates present steel industry expansion program should meet requirements and says further expansion at this time might be uneconomical.

Steel for Autos Ordered Cut

Mar. 8—NPA cuts back the amount of steel that can go into new autos and many other consumer durables during second quarter. Cutbacks for aluminum were 35 per cent and for copper 25 per cent.

Fisher Body is awarded $195 million contract to built tanks for the Army.

Mar. 11—Pittsburgh Works of Jones & Laughlin close after a breakdown in wage negotiations with workers on the Monongahela connecting railroad.

Conversions from Sheet to Plate

Some steel producers begin converting sheet and strip mills to roll plate in compliance with a government request. Increase in monthly plate tonnage from 550,000 to 700,000 tons through this conversion process is the government goal.

Mar. 13—Tin procurements and disposition is again assumed by the government. NPA designates RFC as sole importer.

NPA names 30 products on which steel set-asides are increased.

Koppers gets the contract from Woodward Iron Co. for a 30-oven battery of chemical recovery coke ovens at Woodward, Ala.

New England Mill Seems Doomed

New England's $250 million, integrated steel plant project appears doomed.

Industrial Truck Association is formed by builders of gas and electric trucks, powered hand trucks and makers of batteries and battery-charging equipment.

Mar. 14—Bethlehem Steel abandons plans to build and operate mill project in New England.

Kaiser Steel merges its subsidiary Utah Fuel Co., Salt Lake City, to enter the commercial coal business.

Scrap shortages curtail steel production and threaten further reduction in output.

North American Aviation forms an Electro-Mechanical Division to enter the electronic equipment-making field.

Subcontrols Are Sought

Mar. 15—Railroads win interim freight rate advances ranging from 2 to 4 per cent.

Government reports certificates of necessity for five year amortization rights now total $2,683,000,000.

Mar. 16—Pittsburgh Coke & Chemicals plans new blast furnace at Neville Island plant.

U. S. Steel awards Arthur G. McKee contract to build two 28-foot blast furnaces at its Fairless works.

Mar. 17—*Ward's Automotive Reports* estimates motor vehicle production in the first six months of 1951 may reach a record 3.9 million units.

Mar. 19—Bethlehem Steel announces plans to develop iron ore deposits near Morgantown, Pa.

NPA estimates 82 million tons of finished steel will be available to consumers in 1951, compared with about 72 million tons in 1950.

Timken Roller Bearing is awarded certificate of necessity covering three top-charge furnaces.

Potential subcontractors find one of their best leads on award possibilities dried up as government cuts out all dollar and quantity information on award synopses.

Defense Spending $28.8 Billion

Defense Department says it spent $28.8 billion in first eight months of fiscal 1950, through February.

Mar. 20—Koppers Co. takes option on 158 acres at Fontana, Calif., where it plans a plant to manufacture enamel plate coatings, roofing material.

Economic Commission for Europe estimates European nations, excluding Soviet Union, will have capacity to produce 82.5 million net tons of ingot steel by 1953.

Mar. 21—Two-cent import tax on copper is suspended until Feb. 15, 1953.

Mar. 22—First shipment of ore from Venezuela arrives at Bethlehem Steel Co.'s Sparrows Point, Md., plant.

Mar. 23 National Machine Tool Builders Association reports machine tool orders in February were largest in nine years.

Strike at Jones & Laughlin Steel ends as Army grants wage advance of 12.5 cents an hour to railroad workers.

Mar. 24 Railroads increase petition for freight rate boosts from 6 to 15 per cent.

Government starts inquiry into reported violations of price-ceilings for iron and steel scrap.

Atomic Energy Commission plans $45 million Colorado plant; Dow Chemical Co. will operate plant.

Mar. 27 NPA increases amount of aluminum to be set aside for defense requirements; announces molybdenum will be under complete allocation starting May 1.

Truscon Steel, Republic Steel subsidiary, gets $18 million contract to make tread blocks for tanks.

Rearrangement of auto assembly lines at Willow Run is started to make room for Fairchild Packet production lines designed by Kaiser.

Boron Steels Coming In

American Iron & Steel Institute places two series of lean alloy and three boron-containing steels on tentative standard status.

Armco Steel acquires 64,000 acres of iron ore land in Cherokee County section of East Texas and a 100-ton daily government-owned blast furnace at Rusk, Tex.

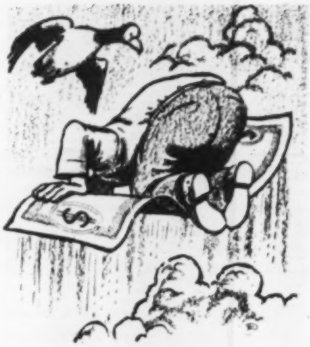
APRIL

April 2 First model of the T-41, 26-ton tank, rolls from Cadillac Division Cleveland Tank Plant three months and four days ahead of target date.

Amended order M-52 reduces molybdenum used in some stainless steels.

April 4 U. S. Steel awards contract to Mesta Machine for 80-inch continuous hot strip mill to serve the Fairless Works.

April 5 Defense Mobilizer Wilson predicts that by the end of 1951, 15 per cent of national production will go for the U. S. rearmament program.



Inflation Trend: Still Up

April 7 NPA assumes complete control over production of several alloys that include nickel steel.

Reynolds Metals estimates its expansion program will cost about $85 million.

April 10 New York Central announces it is laying off several thousand employees in all eastern states because business volume has declined.

April 12 Official effective date for the Controlled Materials Plan is set at July 1.

April 16 Expansion of facilities at Midland, Pa., is started by Crucible Steel, which says total cost will be $27,250,000.

Lukens Steel Co. plans improvement and expansion costing $4 million.

Walter C. Skuce, who headed CMP in World War II, is named Assistant NPA Administrator in charge of production controls — or the Controlled Materials Plan.

April 17 Westinghouse reports formation of an Air Arm Division, says it will erect plant at Baltimore to build advanced electronic, aerial-warfare equipment.

General Electric says its four year expansion plan will cost $350 million.

Canadian Defense Production department states it will begin rationing nickel May 1.

RFC reduces tin five cents a pound, to $1.42.

Wage Stabilization Board Named

April 18 President Truman approves 18-man Wage Stabilization Board with power to arbitrate wage disputes.

April 20 Government cancels complete ban scheduled for May 1 on use of aluminum for nonessential items. New orders permit manufacturers 50 per cent of base quantity in May and June.

April 21 General Electric workers get 9-cent an hour cost of living increase.

April 23 Merger negotiations between Pittsburgh Steel and Allegheny Ludlum are terminated.

April 24 Youngstown Sheet & Tube says it will spend $100 million to increase annual ingot capacity at its Chicago district plant by 1 million tons.

April 25 Office of Price Stabilization announces Ceiling Price Regulation 22, setting prices for a vast number of manufactured articles at pre-Korean levels. Basic price policy provides no industry can increase prices if its dollar profits amount to 85 per cent of average of its three best years from 1946 to 1949.

April 26 Irving S. Olds, chairman of U. S. Steel, says new price regulations are arbitrary, unfair and something that may have a detrimental effect on production.

Alcoa reports it will build an aluminum smelting plant with annual capacity of 170 million pounds at Wenatchee, Wash.

Aluminum Co. of Canada announces a $160 million project in British Columbia that will produce up to 100,000 tons annually.

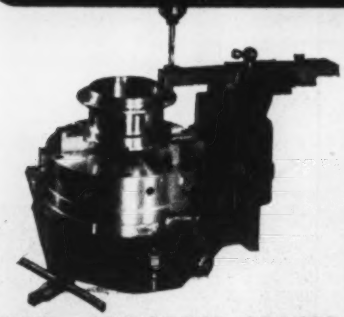
ESA approves a 6-cent wage increase for non-operating rail workers.

April 28 *Ward's Automotive Reports* predicts automobile production for first half of 1951 will exceed 3 million units. Figure compares with record 3,106,000 units produced in same period of '50.

Supreme Court decision holds government is liable for losses incurred when it takes over struck industries.

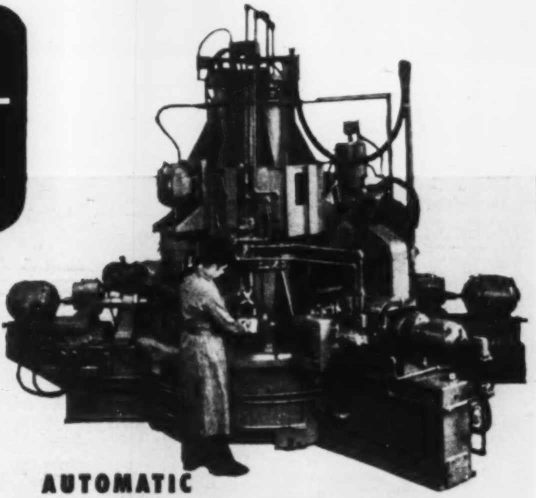
April 13 Oliver Iron Mining, sub-

When it comes to production- come to Hartford Special



NEW — 12" SUPER-SPACERS

This larger size high production indexing fixture has been added to the standard time tested line of Super-Spacers to meet the requirements of present industrial users. The new model has a holding capacity of 12 inches, yet has been redesigned to save weight and increase accessibility. Bulletin S12-101 gives complete particulars.



AUTOMATIC DRILLING & TAPPING MACHINES

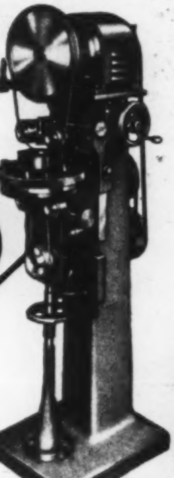
Hartford Special Drilling and Tapping machines are designed to give maximum production, efficiency and economy. Completely self-contained, these machines keep time and waste motion to a minimum, yet are compact and easy to operate. For specific examples write for Bulletin DM-100.

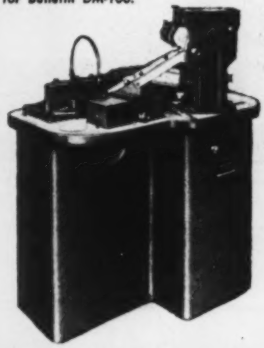
DIE POLISHING MACHINES

The Hartford Special Die Polisher utilizes an endless abrasive belt driven at grinding wheel speed which polishes the die parallel with the line of draw of work through the die. This method imparts a finer finish to the work, reduces upkeep and increases die life.

revolutionary NEW DIAMOND BELT

This new Hartford Special development is a solid endless nylon belt in standard widths of 1/8, 3/16 and 3/8" in 75 inch length, and 3/16, 5/16 and 3/8" in 104 inch lengths. Diamond abrasive grades range from 1-5 micron size to 100 sieve size. All belts are color coded for abrasive grade identification. Bulletin PM-100 gives complete details.





AUTOMATIC THREAD ROLLERS

These high production machines will roll machine screws, wood screws, screwnails, drive screws, etc., as well as specials. Screws with diameters from .086 to .190 inches and thread lengths from 1/8" to 1-1/2" can be rolled to Class 3 Thread Fit. Bulletin TR-100 supplies complete information.

HARTFORD *Special*

THE HARTFORD SPECIAL MACHINERY CO.
HARTFORD 12, CONNECTICUT

sidiary of U. S. Steel, reports it will continue all-rail shipments of iron ore from its mines to Eastern steel mills.

Republic Steel Corp. says its rail shipping operations will be continued through spring, summer and fall.

April 18—DPA announces steel allocation amounting to 1.4 million tons for 24 defense and defense support programs for June delivery.

MAY

Automakers Have Big Plans

May 1—Automakers plan to carry out 1952 model changes—the most comprehensive since post-war revision—because most machines and dies are too far along to be recalled.

R. L. Polk's auto production figures show gap between factory output and sales of new autos has widened by approximately 200,000 units in first quarter.

National Machine Tool Builders Association charges "dilatory defense policies by top government officials are largely responsible for the quandaries machine tool builders now face."

May 3—Steel scrap supplies drop to a low of 5 to 12 days production in the Pittsburgh-Youngstown area.

May 4—E. C. Barringer of Institute of Scrap Iron & Steel Inc. says there will be enough scrap if the industry allows prices high enough to get scrap on the market and if assured of an adequate supply of open cars.

May 5—"Operation Small Business," designation given to Air Force's subcontract clinic that started April 30 at Chicago Navy Pier, attracts over 1000 small business representatives each day.

May 7—NPA announces use of steel in autos will be cut 5 per cent in June, another 5 per cent in July.

Kaiser-Frazer says shut-down of its Willow Run plant for conversion to produce autos and airplanes side by side will take only two weeks.

May 9—Republic Steel Corp. enters agreement with General Motors under which GM will advance about $40 million over period of several years to help Republic finance expansion program in Cleveland.

May 12—Geneva Steel leases idle blast furnace at Ironton, Utah, from Kaiser-Frazer Parts Corp.

NPA authorizes R. G. Le Tourneau Co. to construct a steel mill at Longview, Tex.

Kaiser-Frazer acquires 49 per cent of Chase Aircraft Co., Trenton, N. J.

May 14—Railroads begin plea before Interstate Commerce Commission for requested 15 per cent freight rate increase.

Northwestern Steel & Wire Co. orders two electric furnaces rated at 125,130-ton capacity.

Scrap Committee Formed

Mobilization Committee on Iron & Steel Scrap is formed to help the foundries and steel mills get 32.5 million gross tons of purchased scrap in 1951.

May 15—Baltimore & Ohio's new iron ore pier at Baltimore is opened formally. Facilities can handle 10 million tons of ore a year.

M. A. Hanna says English yards will build two ships to carry Labrador-Quebec iron ore. Vessels each will have 30,000 tons capacity and will be owned by a new company of firms that are stockholders in Iron Ore Co. of Canada, which is developing the Canadian ore property.

Skilled Labor Shortage

Columbia Gas System says it will cut 1951 construction program because of scarcity of steel pipe.

Certificate of necessity granted New England Steel Development Corp. is extended to July 11.

New company, Independent Aluminum Corp., is being formed by Metal Trims Inc. and Himmel Bros. and will build a 120 million pound reduction plant in Northwest.

May 17—Oliver Iron Mining, subsidiary of U. S. Steel, breaks ground for pilot taconite beneficiation plant at Mountain Iron, Minn.

NPA says governors of 28 states agreed to sponsor scrap programs on state, county, and municipal levels.

May 19 — NPA cuts freight car production about 23 per cent starting July 1 after which date companies will get enough steel to make 7600 units a month in third quarter, a drop of 2400 from the previous 10,000 monthly goal.

Consumer Durables Get Less

Consumer durable goods makers are told they can expect about 70 per cent as much steel and 60 per cent as much copper and aluminum in third quarter as their average in first two quarters of 1950.

Third quarter set asides for iron, steel and stainless products are increased in almost all instances.

May 20—Titanium Metals Corp. of America gets certificate of necessity for a $14,162,840 titanium metal project at Henderson, Nev.

May 22—President Truman signs bill suspending import duty of 2 cents a pound on copper. Duty is lifted until Feb. 15, 1953 or until end of present national emergency.

May 23—Navy asks approval of plans to build aircraft engine plant at Detroit; cost: Estimated $35 million.

May 24—Latest DPA survey shows accelerated amortization was granted for facilities costing about $4,045,300,000.

May 28—Defense Mobilizer Wilson tells U. S. companies they may

Write your own ticket on mountings

Horizontal C face mounting, frame with feet. As used on any close-coupled drive.

Type D flange mounting for vertical drive. Also available for horizontal application. Ideal for pump drives.

ELLIOTT Crocker-Wheeler

PROTECTED TYPE FORM BA MOTORS

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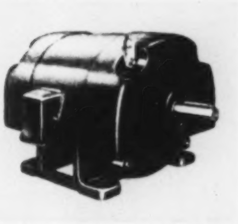
The standard enclosure is open dripproof, with all openings below the centerline. Also available in splashproof enclosure, as illustrated below.

The basic motor has all the Crocker-Wheeler sturdiness of double-row-width bearings, prelubricated and sealed; Vinylastic-insulated coils, Alucast rotors and similar refinements. In NEMA frames 203 to 505 inclusive, and in ratings above. Write for the Form BA Bulletin.



The splash-proof enclosure affords full protection against splashing liquids.

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have to divvy up with other free world consumers on rapidly tightening supplies of American raw materials to aid military production, prevent dependence on Soviet bloc supplies and avoid "political deterioration".

Aircraft Industries Association of America Inc. says U. S. aircraft industry is using 60,851 subcontractors and suppliers, still needs more.

Negotitations are completed between Pittsburgh Steel and Thomas Steel whereby Pittsburgh acquires all the assets and business from Thomas by stock transfer.

May 29—Government buying procedures are explained to 1000 small business men attending defense production conference at Woodbury College, Los Angeles. Government procurement officers, industry leaders detail what manufacturers should do to get defense contracts.

Aluminum restrictions for civilian goods shut down aluminum combination window manufacturing facilities at Ingersoll Products Division of Borg-Warner.

International Nickel announces increases of 6 cents in price of nickel, effective June 1.

May 30—Refrigerator production line of Servel Inc., Evansville, Ind., closes down because of steel and aluminum shortages. Company says it will resume output June 11 at 25 per cent reduced rates.

May 31—Westinghouse announces it will build a jet engine parts plant near Columbus, O.

JUNE

June 1—Shipments of high grade iron ore from Steep Rock Iron Mines Ltd. reached 209,305 tons compared with 176,270 tons for the same period in 1950.

General Electric says Carboloy Co. Inc., Detroit, becomes Carboloy Dept. of GE, effective June 30.

June 3 — Westinghouse and CIO agree on a 9-cent wage hike.

Calumet & Hecla Consolidated Copper announces its Wolverine Tube Div. is entering steel tubing field.

RFC cuts tin prices to domestic consumers from $1.39 to $1.36.

May iron ore shipments on Great Lakes are 33 per cent above same month in 1950.

Engineer Shortage Looms

June 5—Only about half the 38,000 June engineering graduates will be available for industrial employment, reports Engineering Manpower Commission. About 19,000 will be claimed by Armed services.

Machine Tools at a Premium

NPA order M-68 sets a limit of 1.2 million passenger cars for third quarter, assigns each automaker percentage of total.

June 7—U. S. Steel blows in enlarged No. 5 furnace at Youngstown.

June 8—Defense Minerals Administration says it will completely allocate molybdenum ore June 30.

Crucible Steel closes one of its nine Midland, Pa., open hearths because of scrap shortage.

June 11—High coal stocks, reported at about 75 million tons, curtail operations and result in layoffs in many coal mines.

Chrysler announces it is starting series of procurement clinics around U. S. to help small businesses get contracts.

June 12—M. A. Hanna announces a contract with Bethlehem Steel for delivery of 30 million tons of Labrador-Quebec iron ore over a 25-year period.

June 18—Tin price lands at **$1.06** a pound following three more slashes in price by RFC.

Jones & Laughlin says it will spend $7.5 million on iron ore expansion and Benson development in northern New York.

Republic Steel buys steel production facilities from RFC in Kent, O., for $1,534,000.

FTC and steel industry agree to settle their legal battle over pricing practices. Included in the agreement is right of steel companies to absorb freight charges.

Search for Subcontractors

Chrysler says it is looking for 2000 more suppliers to help with defense assignments now on books. Company already has 1200 firms committed to subcontract work.

June 20—Armco Steel licenses Allegheny Ludlum to use patents covering processes for making special types of electrical alloy steel sheet.

Ferro Inc., Cleveland, and Horizons Inc., Princeton, N. J., form Horizons Titanium Corp. to investigate process for mass producing titanium metal.

Question of how much steel expansion should be undertaken is assigned for study to committee named by Defense Mobilizer Wilson.

June 22—Republic Steel reports arrival of its first cargo of iron ore from Liberia.

June 25—Texas International Manganese Corp. announces plans to construct a manganese concentration plant at Brownsville, Tex.

June 27—McLouth Steel gets certificate of necessity covering a $96.6 million expansion, doubling capacity of its Trenton, Mich., plant.

June 29—Treasury Secretary Snyder asks Senate to increase $7.2-billion tax bill approved by the House to at least $3 billion.

Great Britain says it will allocate iron, steel and some nonferrous metals as part of its defense program.

June 30 Congress passes and sends to the White House stop-gap legislation to extend controls until the end of July.

Allegheny Ludlum increases prices on nickel bearing steels to reflect added costs caused by rise in nickel prices.

JULY

July 1—The Controlled Materials Plan goes into effect to cover use of steel, copper and aluminum in more than 1200 defense and defense-support products.

July 2—New bed of high-grade iron ore is reported discovered 100 miles from Sao Paulo, Brazil.

U. S. Steel increases prices ¼-cent to 1 cent a pound on several nickel bearing steels.

Commies Get a Hand

Mine & Smelter Workers begin intermittent walkouts at American Smelting & Refining's Garfield, Utah, plant.

Standard Slag Co. ships 17,000 tons of iron ore from Nevada to Japan, initiating a new ore movement.

Reynolds Metals plans $12 million expansion of aluminum production plant at Longview, Wash.

July 3—Chrysler gets $91 million contract from Navy to build, equip and operate jet aircraft engine plant in Macomb county near Detroit.

July 4—Niagara Mohawk Corp. sells coke-producing facilities at Troy, N. Y., to Republic Steel.

July 5—A Senate subcommittee reports tungsten supplies of 1951 will be 2 million pounds short.

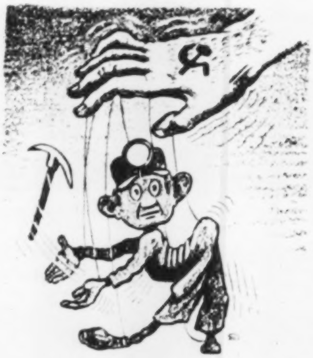
Hanna Ore & Coal and Sand Products Corp., Detroit, organize new ore carrying company—Hansand Steam Ship Corp.

NPA places zinc under complete allocation, effective Aug. 1.

Sharon Steel boosts price of stainless steel to cover 6-cent a pound increase in nickel prices.

Kaiser Steel gets 75 per cent tax write-off on $55-million pig iron producing plant in Fontana, Calif.

July 6—NPA puts slab zinc under complete allocation controls.


Copper Strike

Erie Forge, reactivates two open hearth furnaces, idle since World War II.

July 9 — International Materials Conference sets up world allocation of tungsten and molybdenum. U. S. gets largest share of both metals.

July 11—New England Steel Development Corp. wins second four-month extension on certificate of necessity covering proposed New England steel plant.

Highest Steel Output in History

American Iron & Steel Institute says U. S. steel output in June, the second quarter, and the first half of 1951 was highest in history.

West Germans indicate they will balk at Schuman plan that would put steel and coal resources of West Germany, France, Belgium, Luxemburg and Italy under international control.

July 12—Issuance of a lead allocation is postponed by NPA.

International Materials Conference announces sulphur allocation on world-wide basis.

Wheeling Steel adds $24 million to amount it will spend on plant modernization in next two years.

July 13—Lone Star Steel orders $4 million in equipment from General Electric for new steel mill in Lone Star, Tex.

NPA says freight car builders will get enough steel to build 9500 cars a month in third quarter.

Argonaut Co. Ltd., says first load of ore in shipping program from British Columbia to Japan starts.

NPA begins co-ordinating various local organizations in a national "scrap mobilization drive" aimed at uncovering at least 8 million tons of dormant scrap.

July 16 — Weirton Steel breaks ground for construction of new blast furnace — annual capacity, 480,000 tons.

Bethlehem gets authorization for fast tax write-off of 85 per cent on a $29 million expansion program. Company is starting to increase coke and iron capacities.

July 17 — Europe's largest steel plant, built in Wales with Marshall Plan aid, begins producing sheet and tin plate.

General overriding Regulation 15, issued by OPS, supercedes CPR 30 to permit machine tool builders to make liberal individual adjustments in ceiling prices.

July 23—Some steel consumers report they cannot cash CMP September steel tickets because mills are already booked up.

Frederick S. Blackall Jr., vice president, National Machine Tool Builders Association, slams GOR 15 as profit control, not price control.

Prices of steel products advance $5.00 a ton in Canada.

July 24—Jessop Steel and Firth Sterling Steel & Carbide raise prices of steels containing tungsten by 1½ cents a pound for each 1 per cent of tungsten contained.

July 25—U.S. Steel and United Steel Workers of America agree on additional employee insurance benefits.

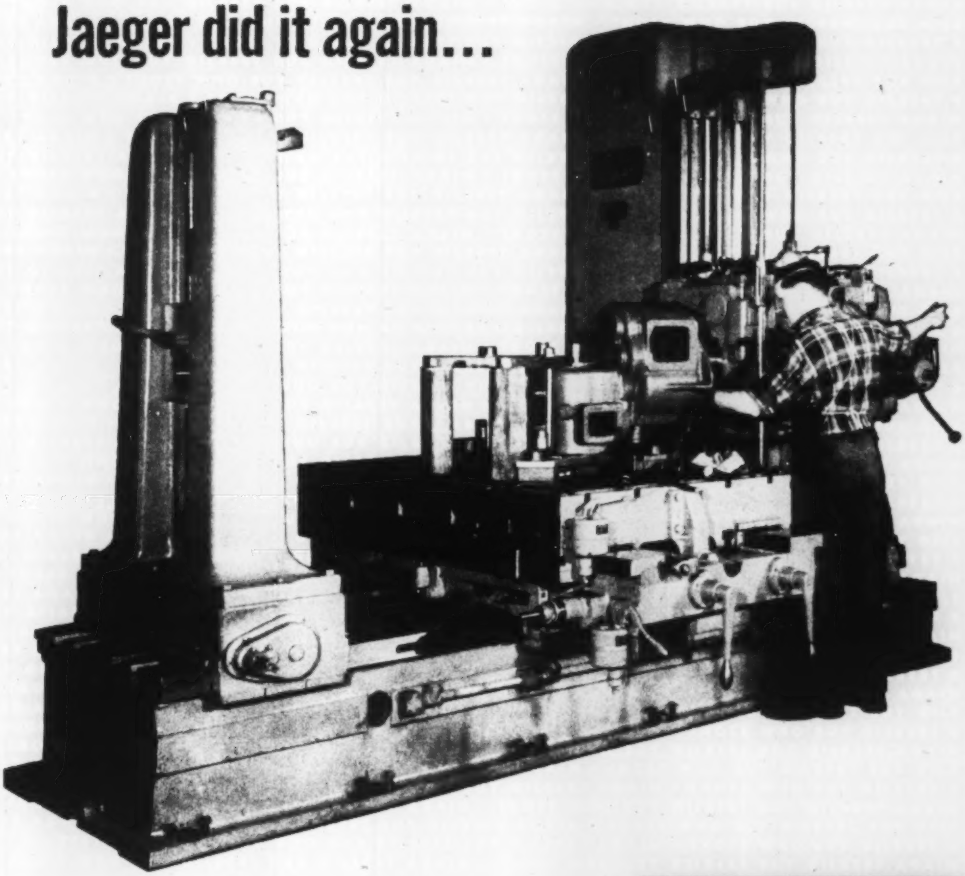
Alcoa announces it will build an $80 million aluminum smelting plant in Milan County, Waco, Tex. Plant's annual capacity will be 170 million pounds of aluminum and first such unit to use lignite for fuel.

Koppers Co. buys 10 per cent interest in Continuous Metalcast Corp.

July 26—Ceiling price on copper refined from foreign ores is raised 3 cents, to 27½ cents a pound. Domestic copper remains at 24½ cents a pound.

NPA issues order M-76 allocating

Jaeger did it again...



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Shown above is one of four Cincinnati Gilbert boring mills on the job at The Jaeger Machine Co., Columbus, Ohio, well-known builder of construction machinery. A fifth is on the way. That's pretty good evidence that Gilberts pay off: Gilbert operators can *feel* the smooth precision of their machines; management can *measure* the high return per dollar invested . . . As a repeat customer, Jaeger is not alone. Better than 60% of Gilbert users have come back repeatedly for more of the same . . . Write for Bulletin 1244-B.

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Ford says it will spend $43 million to increase Rouge plant steel output 190,000 tons.

July 27 Freyn Engineering of Koppers takes over engineering, fabricating, erection and sale of continuous casting machines licensed by Continuous Metalcast Corp.

Diamond Magnesium Co. resumes production at Painesville, O. plant after six years of idleness.

New battery of 87 coke ovens begins producing at the Clairton Works of U. S. Steel.

July 28 Alan Wood Steel blows in its 500-ton blast furnace.

July 31 Sharon Steel begins drilling test gas well under its main works to augment natural gas supply.

Ticket Holders Out of Luck

NPA reports it can do nothing for out-of-luck ticket holders for September steel, but says many problems will solve themselves naturally by fourth quarter.

Bethlehem Pacific Coast Steel announces it has a $47,465,000 contract to build five Mariner-class cargo ships for Maritime Administration.

New Defense Production Act is signed by President; he offers sharp criticism of amendments that he says will prevent administration from holding down prices.

AUGUST

Aug. 1 Defending GOR 15, Price Stabilizer Mike DiSalle maintains regulation will stimulate production and offset expansion risks, not control profits.

Automakers report initial success in experiment with "white brass" underplate to replace copper and nickel in automotive trim.

RFC cuts tin price another 3 cents, to $1.03.

Aug. 3 Backing for policy of allowing wages to rise according to the cost of living is given by Wage Stabilization Board.

NPA announces all steel, copper and aluminum will be placed under a closed-end CMP plan on Oct. 1.

New machine tool pricing regulation and liberalized rules under which tool pool order program operates are promised by government.

Toolbuilders Get Priority

Aug. 4 Machine tool builders will get first call on output of their own industry says NPA Administrator Manly Fleischmann.

New construction is banned by government except where authorization and allotment of materials is gained, when that construction requires more than a specified minimum of carbon steel and copper.

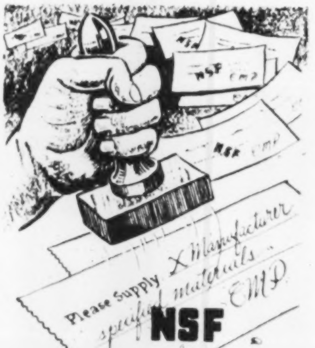
Aug. 5 First self-contained plant for producing titanium metal is planned by Titanium Metals Corp. of America. Site chosen is Henderson, Nev.; cost: $14 million.

Bethlehem Steel borrows $100 million for construction already underway.

Aug. 8 ICC grants freight rate increase of 9 per cent to eastern lines and 6 per cent to southern and western lines. New rates will add $548 million annually to rail revenue.

Aug. 9 Steel producers launch nationwide campaign to increase flow of iron and steel scrap to mills.

Aug. 10 July steel production in Great Britain is reported at annual rate of 13,317,000 tons. Production for 1951 is estimated at 16 million tons compared with 16.3 million tons for 1950.



CMP: More Tickets Than Materials

Aug. 14 Contract committing Westinghouse to build power facilities for AEC's new plant at Paducah, Ky., is valued by company at $6.7 million.

Air Force procurement officials testifying before small business committee, insist it is necessary to place 80 or 90 per cent of direct contracts with large companies.

Automotive scrap drive gets underway, co-ordinated by an Automotive Manufacturers' Association committee.

Spokesmen for New England Steel Development Corp. are reported negotiating with Barium Steel in effort to find a company to build and operate New England project.

First heat of steel is tapped from Weirton Steel's second 550-ton open hearth.

Aug. 15 Colorado Fuel & Iron announces it will spend $30 million to build a new seamless tube mill at its Pueblo, Colo., plant.

Wilson: 'Living Costs Will Go Up'

Defense Mobilizer Wilson estimates new price controls in the Defense Production Act will increase living costs 5 to 8 per cent.

Aug. 16 — Pennsylvania Railroad announces plans to build an $8 million iron ore pier on the Delaware river at Philadelphia.

British iron and steel prices were increased, some as much as 25 per cent.

Bethlehem Steel breaks ground for the Grace mine near Morgantown, Pa.; it will produce magnetite ore.

Aug. 18 — Economic Stabilizer Johnston approves Wage Stabilization formula allowing wages to fluctuate according to cost of living.

Moratorium on Fast Amortization

Defense Production Administration announces 60-day moratorium on fast amortization privileges to permit review of entire certificate of necessity setup.

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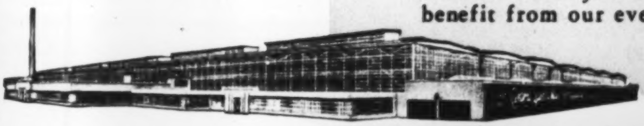

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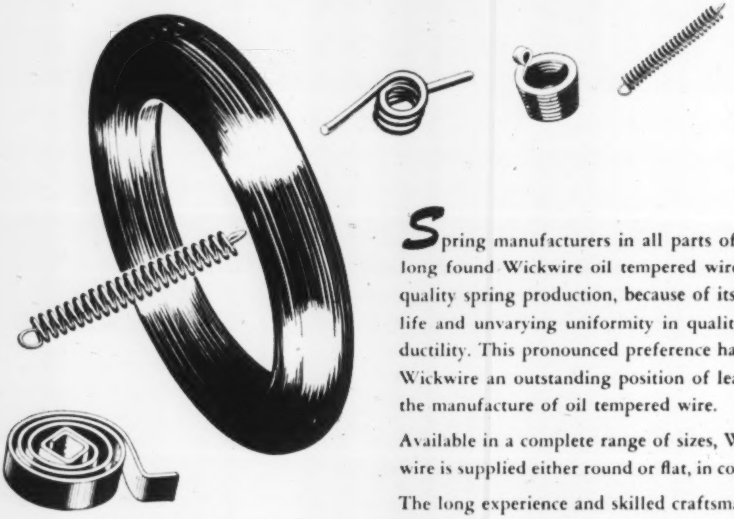

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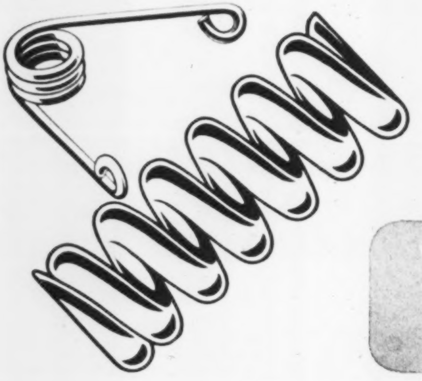

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CF&I

Aug. 21 — Machine tool builders win price fight with OPS through revision of CPR 30 that allows 12 per cent increase in base period prices for determining the ceiling.

NPA gives authorization for steel producers to accept or reject orders under CMP without regard to date of receipt until 15 days prior to expiration of lead times—after military orders are filled.

Slowdown in industry expansion programs results from cutbacks in structural steel allotments decreed by NPA.

Sid W. Richardson, Ft. Worth, Tex., oil man, says he'll put up money to build and operate a Bureau of Mines project to extract manganese from slag.

Aug. 22 — Freeport Sulphur Co. says it will spend about $10 million on a new plant in Garden Island Bay at mouth of Mississippi river where it recently discovered a deposit of sulphur.

Aug. 24 — Steel can-makers will work on an allotment of 4 to 4.4 million tons of steel in the 12 months beginning Oct. 1—more than they have ever used in one year—reports Defense Production Administration.

Copper: Critical and Struck

Aug. 27—Mine & Smelter Workers walk out, beginning a nationwide strike against copper industry.

British Steel Authority permits increase of $5.60 a ton in scrap steel price.

Aug. 28 — Loan authorization of $46 million goes to Harvey Machine Co. Inc. from DPA on basis of Harvey's plans to build an aluminum plant at Kalispell, Mont.

Aug. 31—Scrap from Korean battlefields and India is to be returned under authority granted General Services Administration.

Copper strike is broken when Kennecott Copper settles wage dispute, granting Mine & Smelter Workers 15-cent wage increase and a pension plan.

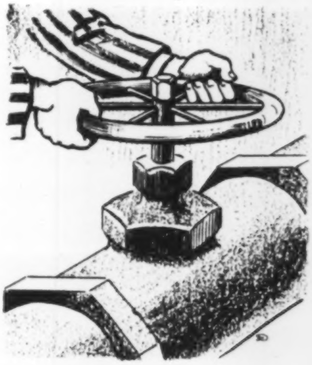
SEPTEMBER

Sept. 1—Estimates of copper lost through intermittent strikes in industry since July 1 range to 55,000 tons.

Sept. 3—American Iron & Steel Institute reports Venezuelan government is considering construction of small steel mill to use newly developed ores in that country.

Sept. 4—Industry-wide record for total monthly production is set by Bethlehem's blast furnace "H" at Sparrows Point, Md., in August. Company says "H" poured 55,835 tons for month.

Sept. 5—Plans to build a ferromanganese plant at Houston are announced by a new company, Tenn-Tex Alloy & Chemical Corp.



Consumer Goods Flow Is Cut

Purchase of tin at "a fair price" —$1.12 a pound—is object of RFC in negotiations being conducted with Bolivia.

Sept. 7—Price increases averaging 5 to 6 per cent are granted to automakers.

Sept. 10—Assurance that they will receive 1 million tons of steel over a five-year period prompts Packard and Chrysler to loan Pittsburgh Steel $10 million.

Tinless Tin Cans

Tinless cans made by processes specifying heavy aluminum foil and plastics or foil and steel sheets are announced by Reynolds Metals.

Scrap industry leaders, trade association executives and business magazine editors meet in emergency session to plan and launch a national scrap campaign.

Toolbuilders Need More Workers

Sept. 11—U. S. Bureau of Labor Statistics estimates machine tool industry needs 50 per cent more employees to meet peak mobilization production goals.

Sept. 17—NPA relaxes CMP Regulation 1 to permit manufacturers to order up to 40 per cent of their quarterly allotment of steel, copper and aluminum in any month of a quarter.

Sept. 18—Structural steel requirements for fourth quarter exceed supply by 233 per cent, reports DPA.

Sept. 19—Consumer durable goods manufacturers will get 20,330,000 pounds of stainless added to allotments for fourth quarter by Defense Production Administration.

Loan of $46 million to Harvey Machine Co. falls through when Interior Department blocks funds authorized by Defense Production Administration. Reason given is insufficient power to run an aluminum plant at Kalispell, Mont.

Metal Products Division of Koppers reports it will make a new-type continuous casting machine.

Sept. 22—High grade ore will be produced from magnetic taconite in a $75 million plant that Reserve Mining Co. says it plans to build at Beaver Bay, Minn.

Sept. 24—First unit at Fairless Works—the tin plate mill—will begin operations on schedule, about Jan. 1, says U. S. Steel.

Guaranteed loans for working capital and facilities expansion are offered machine tool builders by General Services Administration.

Society of Automotive Engineers say tests made on boron steel show them to be equal to alloy-heavy types.

Sept. 25 — Agreement to import forging billets from several Belgian steel producers is announced by Packard and Studebaker.

Sept. 26—Atomic Energy Commission names Union Carbon & Carbide to operate new uranium-235 production plant at Paducah, Ky.

Sept. 27—Westinghouse announces

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expansion program extending beyond 1953 that will cost about $300 million. Company says it will finance development through private sources.

Vulcan Mold & Iron reports it will expand ingot mold facilities on a 30-acre tract purchased in New Jersey.

Sept. 28—Increased cost of conversion steel can be reflected by manufacturers' prices, rules OPS.

Home appliance manufacturers meet with NPA and are told to expect another cut in controlled materials for first quarter of 1952. Their steel rations are now 52 per cent of pre-Korean levels.

Steel users are told they can now buy foreign imported steel after it reaches U. S. without deducting it from their regular allotments.

House small business subcommittee studying CMP criticizes NPA for not allocating sufficient structural steel to carry out steel industry expansions in fourth quarter.

Fisher Body completes arrangements with Bullard Co. to build under subcontract that firm's turret lathes.

NPA sets Oct. 8 as the cut-off date after which mills must charge consumers' undelivered CMP orders for third quarter against fourth quarter allotments.

General Motors says it will build a 1 million-square foot aircraft plant, costing $30 million, at Flint, Mich.

OCTOBER

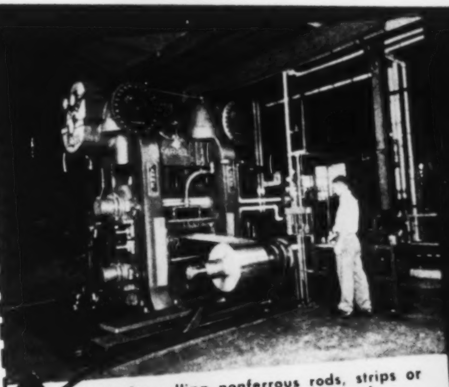
Oct. 2—OPS raises domestic ceiling prices on lead and zinc 2 cents a pound and imposes ceilings on imports of those metals, setting price at 19 cents for lead and 19½ cents for zinc.

Oct. 3 — House-Senate Committee agrees on a 5 per cent tax hike for corporation earnings, retroactive to Apr. 1, 1951.

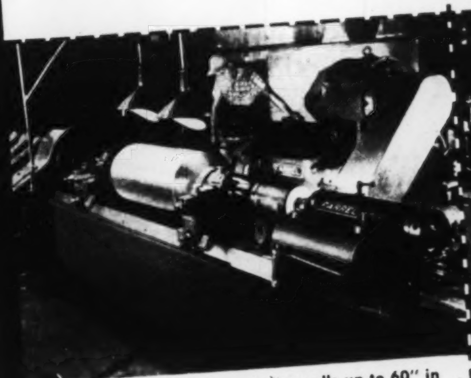
Oct. 4—General Electric grants a minimum wage increase of 3½ cents, retroactive to Sept. 15, averting a strike by 70,000 workers in 55 plants.

Senate votes 49 to 21 to change Capehart amendment to Defense Production Act. OPS would be

Check yo✓quirements WITH FARREL



✓ Mills for rolling nonferrous rods, strips or sheets, metal foils and cold strip steel.



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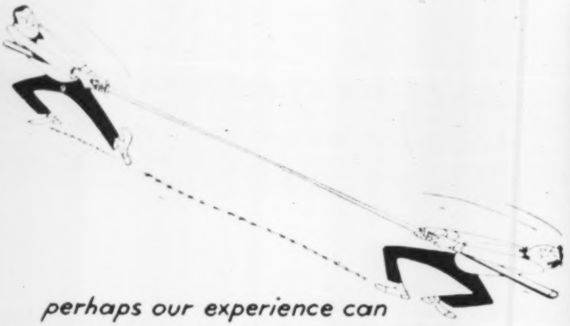

perhaps our experience can

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your alloy steel supplies!

You have doubtless heard about "bar-stretchers." Have you ever seen one? Wheelock, Lovejoy has several — any one of which can help you stretch your alloy steel supply so that you can keep up your production schedules during this period of unavoidable shortages. Having been in the steel business for over 100 years, our staff of metallurgists is in a unique position to help solve your difficulties. Our "bar-stretchers" include suggestions for substitute grades — alternate methods of manufacture — varying your present methods of treatment — and many more!

A letter or phone call to your nearest Wheelock, Lovejoy warehouse will bring an experienced man to help you stretch your alloy steel supply.

And he will be delighted to be of service! *SCRAP is worth money, and every pound turned in means more steel for you — so get in the SCRAP!*

Write today for your FREE COPY of the Wheelock, Lovejoy Data Book, indicating your title and company identification. It contains complete technical information on grades, applications, physical properties, tests, heat treating, etc.

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BILLETS AND FORGINGS FOR PRODUCTION, TOOL ROOM AND MAINTENANCE REQUIREMENTS

permitted to establish industry-wide price ceilings, including only a "reasonable allowance" for increases in direct costs.

Oct. 5—Alcoa president I. W. Wilson says company was forced to reduce operations at many fabricating plants due to Northwest power shortages and NPA interference with production schedules.

NPA orders increase in amount of steel that producers must ship to warehouses after Jan. 1, 1952, to protect small users. Amount is upped from 85 to 100 per cent of the average monthly tonnage for 1950.

Murray Tips His Hand

Oct. 8—Phil Murray, C.I.O. steelworkers' president, says union's wage policy committee will meet about Nov. 15 to prepare for negotiations. He indicates pay increase requested will be considerably more than the 4 cents allowed by OPS.

NPA says it turned down more than $505 million in requested fourth quarter construction to conserve materials for defense needs.

Oct. 9—Aluminum supplies will be taken from the government stockpile to fill fourth quarter CMP allotments, says NPA. Same policy will probably be followed in first quarter of 1952.

Oct. 10—NPA says it will try to allocate automakers enough controlled materials to make 950,000 passenger cars in first quarter, 1952—a cut of 13.6 per cent from fourth quarter, 1951.

Survey made by Edison Electric Institute shows electric utilities will squeeze through winter with smallest reserve generating margin since 1948.

Oct. 11—Tax increases of $5,750 million yearly are approved by the joint House-Senate conferees.

Wage Increase? Price Increase!

Oct. 12 — Steel industry leaders, through Adm. Ben Moreell, Jones & Laughlin president, told Defense Mobilizer Wilson they will need steel price increases if expected demands of labor are met.

Oct. 14—Unemployment in Detroit reached 88,000 in September due

TINNERMAN
Speed Nut
SAVINGS STORIES
VOLUME II

Behind Tinnerman Speed Nut Savings Stories stand these Bliss Presses

When it came to high-volume, low-cost production of its famous Speed Nuts, Tinnerman Products, Inc., turned to Bliss High Production presses. That is because Bliss HP presses provide definite operating advantages, especially on high-speed, progressive die operations.

Here's how the Bliss design cuts vibration and deflection to a minimum; maintains high output and long die life:

- Crankshaft with oversize crankpins supported in heavy box-type crown
- Frame of high-tensile, fine-grained Meehanite with heavy sections minimizing deflection
- Slide guided in bronze-lined square gibs throughout entire stroke and adjustment. Gibs are aligned to extremely close tolerances for very accurate slide guidance
- Rolls and feed adjustments built-in for precision feeding
- Compact design for high-speed operation
- Die area easily accessible from both front and rear of press for ease in setting complicated multiple-station dies.

If your metal stampings involve high-volume production and or progressive die operations—you will find it worth your while to investigate Bliss HP presses. Let a Bliss sales engineer tell you about the large range of sizes, the full significance of these design features. Write for catalog.

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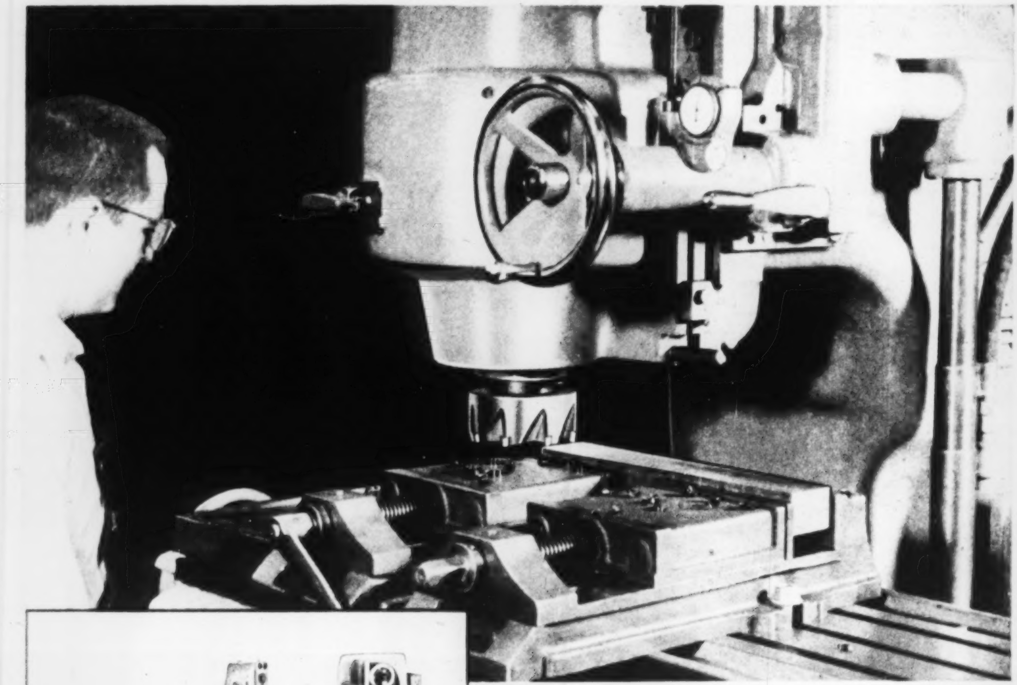
FACTS TELL THE STORY...

NEW CK MILLING MACHINE CUTS PRODUCTION TIME 75%

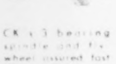


C-K MILLING MACHINE FEATURES THAT HELP DO THIS JOB BETTER

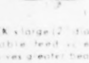
New CK column easily absorbed vibration from heavy cutting load.

Greater horsepower permitted maximum results from modern cutter.

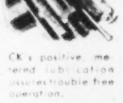
24 different spindle speeds (13 to 1300 rpm) plus 32 different table feeds (⅝" to 90" ipm) meant operator selected proper combination to take full advantage of high horsepower and modern tools.



CK's 3 bearing spindle and flywheel assured fast metal removal, excellent finish.



CK's large (2" dia.) table feed screw gives greater bearing contact for smoother feed.



CK's positive, metered lubrication assures trouble free operation.

The FACTS on this job are:

Operation Face mill four sides
Workpiece: Ram for slotting attachment
Material: S.A.E. 4615 forging — 2¼" x 2¾" x 18½"
Machine: New 25hp No. 4 CK vertical
Cutter: 6" dia., 8 Tooth Carbide Face Mill with 7° negative primary rake angle.
Cutter Speed: 275 rpm
Depth of Cut: ¼"
Table Feed 25 ipm
Machining Time: 3.8 minutes

Total Saving in actual machining time: 11.9 minutes or 75.8%

NOTE: Part machined is the operating ram used in a slotting attachment. It must be tough and accurate. It is milled to a semifinish state and finish ground to final accuracy.

It will pay you to see the new **CK** line of milling machines — check them against your own requirements. You'll notice how every feature is designed and job-proven to give you cost-cutting results — greater machine capacity, productivity and better finished products. So, for the full story, contact your nearest Kearney & Trecker representative or write: Kearney & Trecker Corp., 6784 W. National Avenue, Milwaukee 14, Wisconsin.

KEARNEY & TRECKER
MILWAUKEE
MACHINE TOOLS

to "failure of defense production to keep pace with cutbacks in civilian output," says a survey made by state and federal employment commissions.

Oct. 15 — Four-hundred metallurgists from 36 free world nations join an equal number of U. S. metalworking men to open the first World Metallurgical Congress in Detroit.

Wage Stabilization Board asks United Auto Workers to call off strikes against Douglas Aircraft Co. and Wright Aeronautical Corp. plants. The union turned down similar pleas on ten Borg-Warner plants.

Oct. 16—House Rules Committee votes against clearing the Senate-passed bill revising the Capehart amendment to the Defense Production Act.

Left-wing United Electrical Workers begin a strike vote among 50,000 members in 46 General Electric plants. The union rejected terms of a new contract.

Military shipments are tied up on New York docks as a wildcat longshoremen's strike becomes serious in its second day.

Oct. 17—NPA says rail equipment makers will get only enough steel, copper and aluminum in first quarter of 1952 to produce 21,450 freight cars and 800 locomotives. It is a cut from the 27,000 cars allowed in final three months of 1951.

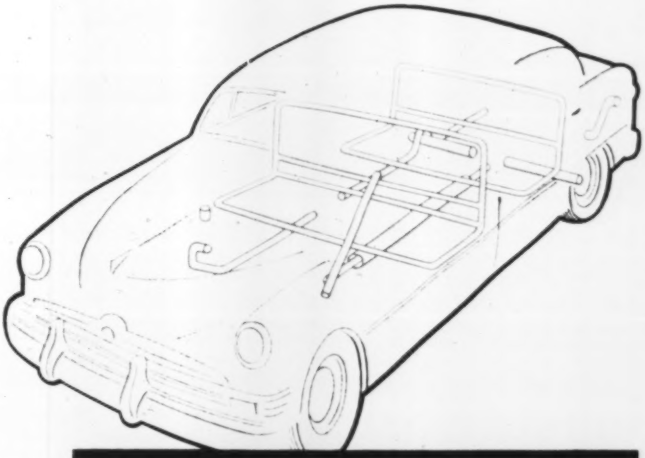
DPA says five-year writeoffs were granted on 4119 projects costing $9,693 million.

General Electric lays off 2000 workers at Syracuse, N. Y., because of materials shortages in television receiver production.

Oct. 18—DPA 60-day moratorium on fast tax write-offs ends. After Nov. 1, the agency decrees, no project will be allowed fast amortization unless certified before work is started.

Household appliance makers are going to get 11.6 per cent less steel, 29 per cent less copper and 16 per cent less aluminum in first quarter in 1952, reports NPA Administrator Manly Fleischmann.

another job for Brainard ELECTRIC-WELDED TUBING



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Expanded production at Brainard's new tube mill permits fast delivery on certain sizes of electric-welded steel tubing. Send coupon for immediate information.

Go no further than your own car to find the wide application of Brainard Electric-welded steel tubing.

The automotive industry fabricates Brainard tubing in a hundred shapes. For hard-working parts—propeller shafts, torque tubes, steering columns. For structural members—tubular seat frames, rear axle housings. For air, gasoline, and exhaust lines.

Brainard's integrated production facilities assure quality control throughout manufacture . . . from ore to finished tubing. You can depend on Brainard service for *your* needs. District offices in principal cities throughout the U. S.

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☐ Send catalog listing complete specifications of Brainard Tubing.

☐ Advise availability of following sizes __________

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Oct. 19—House approves the tax bill by vote of 185 to 160 and sends it to the President. Measure raises federal revenues $5,691 million yearly.

Railroads ask ICC to reconsider its decision on freight rate increases and grant the full 15 per cent requested.

Oct. 22—OPS raises ceiling prices on lead and zinc scrap 2 cents a pound.

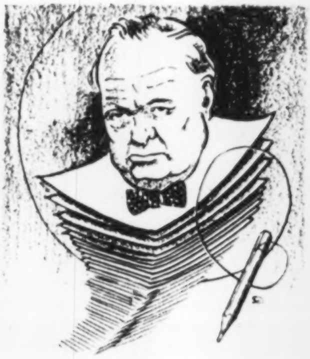
Titanium Metals Corp. of America reports production is started at new Henderson, Nev., plant.

Oct. 24—Alcoa says it will build plant at Rockdale, Tex., to produce 85,000 tons of primary aluminum.

OPS raises iron and steel scrap prices $2 a ton and revises classification on several grades.

Oct. 25—Tories win in Great Britain; Churchill becomes prime minister.

Oct. 29—Plans for an additional $40 million expansion at Indiana Harbor, Ind., are announced by Youngstown Sheet & Tube. Company says it has certificates of necessity covering work, which will expand finishing facilities.



Churchill Tops British Cabinet

Back-to-work move on New York piers, predicted by Joseph Ryan, Longshoremen's president, fails. Military goods are moving again after pickets are withdrawn from Army docks.

First of three electric furnaces being installed by R. G. Le Tourneau at its Longview, Tex., steel plant will be melting scrap into ingots within 30 days.

'Most Critical' Metal Listed

DPA's third list of "Basic Materials and Alternates" says copper supplies are almost dangerously short and includes for the first time a new grouping of materials, called "most critical."

Brotherhood of Locomotive Firemen & Enginemen begins lining up progressive strike against four roads to enforce unmet demands for a shorter work week for yard employees, revised working rules and wage increases.

Oct. 30—Steel strikes at this time must and will be avoided, says Defense Mobilizer Wilson. He expresses confidence union members would maintain production as United Steelworkers' union chiefs mailed contract termination notices to producers, effective Dec. 1.

New York Shipping Association files complaint with NLRB, charging the dock strikers with breach

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The New Kaptrode Electrode with Kaptrode Shank Adapter: This small cap type electrode inserts into semi-permanent shank, forming an assembly to fit any standard Morse taper holder of corresponding taper size.

COPPER SAVINGS—75% and more with widespread, careful use.

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INVENTORY SAVINGS—30% and up; only small supply of shanks needed; electrodes are interchangeable; one shank outlasts ten or more tips.

TIME SAVINGS—electrodes quickly, easily inserted and removed.

For the toughest electrode consuming job in your plant, order a supply of WW Kaptrode Electrodes NOW!

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DIES • TIPS • WHEELS • HOLDERS

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FROM AUTO TRIM MANUFACTURE . . .

Vapor degreasing quickly removes stubborn buffing compounds from auto trim before further processing. Drawing compounds are removed with equal speed in simple, easily operated equipment.

. . . TO STREET BUS MAINTENANCE

Heavy grease is thoroughly removed from clutches in this bus maintenance shop. Vapor degreasing cleans parts of any size, shape, or metal . . . cuts "down-time" in maintenance operations.

Large auto factories and small maintenance shops alike require peak efficiency in cleaning a great variety of metal parts. Vapor degreasing with Du Pont "Triclene" D Trichlorethylene keeps pace with production and maintenance schedules . . . removes heavy grease and oils from the most intricate pieces. Parts come out thoroughly cleaned—usually in less than a minute!

Compact vapor degreasing equipment is easily installed in a small area. Units are available for a wide range of capacities and can be adapted to manual or mechanized operation. The final cleaning step in each unit—passing the parts through pure "Triclene" D vapors—leaves each piece clean, warm and dry, instantly ready for the next process. Shopmen like the simplicity of the equipment . . . managers like the economy of the operation.

"Triclene" D has been used for metal degreasing by thousands of plants for many years. It's stable and pure . . . stands up under moisture, air, heat and other destructive influences. With it comes complete Du Pont service and the benefits of experienced technical help in your metal cleaning program.

The coupon below will bring you all the facts about vapor degreasing with "Triclene" D.

DU PONT
TRICLENE D

DU PONT *non-flammable* **SOLVENTS for VAPOR DEGREASING**

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Electrochemicals Dept., Wilmington 98, Delaware

Please send me detailed information on Vapor Degreasing: applications, advantages, equipment used, and Du Pont solvents available. We are interested in cleaning ______________ products.

Name ______________________ *Position* __________

Firm ______________________________________

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City ______________________ *State* __________ of contract and violation of the Taft-Hartley Law.

Ford says it will lay off 30,000 employees at its Rouge plant for part or all of the first two weeks in December due to model changeovers and output restrictions.

Jones & Laughlin Steel Corp. taps the first of 11 new open hearths at its Pittsburgh Works. J. & L.'s project, costing $70 million, is first steel industry defense expansion to reach production.

Oct. 31 — Nash Motors reports parts shortages caused by continued Borg-Warner Corp. strike will cause suspension of auto production for one week at Milwaukee and Kenosha, Wis., plants, idling 13,000.

NOVEMBER

Nov. 1 — Three auto companies, Kaiser-Frazer, Nash, Willys-Overland, get additional 1.27 per cent of the industry's second quarter quota at the expense of larger companies.

C.I.O. Auto Workers call off three-week strike against ten Borg-Warner plants when WSB asks time to rule on union pay demands.

Nov. 3—Tool and die makers report shortage of 5000 skilled workers in contract shops.

Nov. 5 — Anaconda Copper takes over commitments of Harvey Machine Co. Inc. to build an aluminum ingot plant at Kalispell, Mont. Harvey's plans fell through when Interior Department requested a government loan be held up.

Nov. 6—Brotherhood of Locomotive Enginemen & Firemen orders its men to strike four key roads Nov. 8. President Truman moves immediately to create an emergency board to deal with the dispute, barring the walkout for at least 60 days.

Major Model Changes Banned

Nov. 8—NPA bans major model changes in new autos and home appliances after Feb. 1. Order reserves almost entire machine tool output for defense use after that date.

OPS issues orders permitting manufacturers covered by CPR 30 and 22 to revise price ceilings under Capehart amendment.

Government discloses it will discontinue stockpiling tin.

New York's striking longshoremen begin returning to work after 25 days.

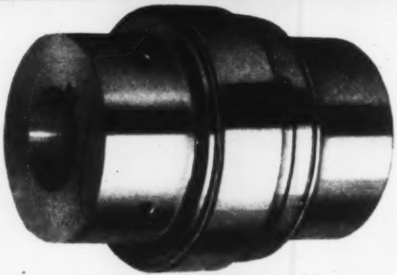
Richard E. LeBlond, president of National Machine Tool Builders' Association, says subcontracting is best and fastest way to increase production. Estimates show about one-third of total output will come from subcontractors by July, 1952.

Wilson: 'CMP at 95% Efficiency'

Nov. 9—Defense Mobilizer Wilson estimates CMP is operating "at between 90 and 95 per cent efficiency in only its second quarter."

Hudson idles 5000 workers when it suspends auto assemblies for "several weeks" to prepare for work on four aircraft orders.

Phil Murray is elected to twelfth term as CIO president.



FOR YEARS OF TROUBLE-FREE SERVICE... on run-out tables, too...

LOVEJOY HEAVY DUTY FLEXIBLE COUPLINGS

Yes, Lovejoy makes the "big ones", too—heavy duty flexible couplings that can take the roughest abuse for years with a minimum of maintenance—on run-out tables and other equipment, too. Free-floating load cushions are suspended between heavy metal jaws. Cushions last two to-five years and there's no shutdown for changing.

Lovejoy Flexible Couplings instantly counteract mis-alignment, vibration, backlash and surge—insure you against costly breakdowns and shut-downs due to coupling failure. 1/6 to 800 H.P., at 100 R.P.M. No lubrication needed, ever.

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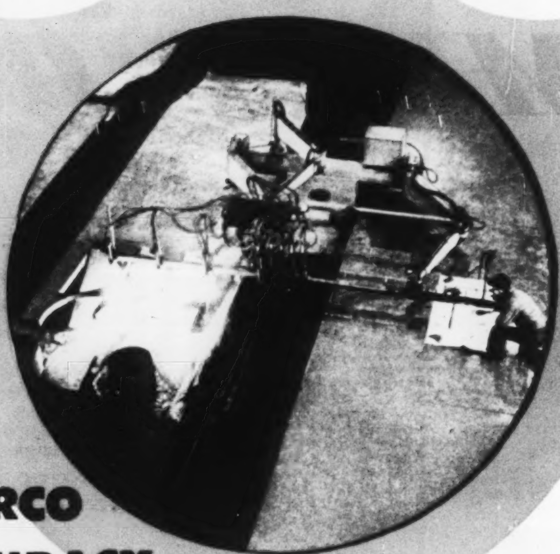

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AIRCO NO.50 TRAVOGRAPH

GAS CUTTING MACHINE

Airco's NEW No. 50 Travograph is a rugged, all-welded gas cutting machine. Its massive, long-lived design is engineered to give fingertip sensitivity to all production operations. Used as a basic tool for multi-torch shape cutting, squaring or beveling, its outstanding accuracy slashes reject loss and working costs to a minimum.

Today's most modern production tool, the rugged new Airco No. 50 Travograph precision-cuts steel—light plates, heavy slabs, billets, forgings—to close tolerances. Here are the reasons for its remarkable exactness . . . the "why" it guarantees faithful reproduction.

1. All-welded construction provides a combination of ruggedness, resistance to vibration, and precision operation.
2. Rigidity built into the torch-bearing pantograph arms enables the torch bar to support a uniform load of *500 lbs!*
3. Perfectly-balanced when properly set on 16' rails.
4. Ball bearings in the hinge-joints make it extremely smooth operating.

For greatest operating flexibility, the new No. 50 Travograph can be equipped with three distinctly different tracing devices—manual, magnetic, or the full-automatic "Electronic Bloodhound". The "Electronic Bloodhound" needs only an outline drawing or silhouette to cut the most intricate shapes smoothly, sharply, quickly . . . and with extreme accuracy.

If your production line requires quantity flame shaping operations . . . and if close precision cutting would lower your finish-machining costs . . . it will pay you to investigate Airco's new No. 50 Travograph. For complete information write your nearest Airco office for the new catalog just coming off the press.

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Nov. 12—New England Steel Development Corp. gets another four-month extension of the certificate of necessity covering its projected steel plant in Connecticut.

Nov. 13—Anaconda Copper signs an agreement by which company will activate idle Yerington mine in Lyon county, Nev. Under contract, copper that Anaconda cannot sell will be purchased by government at 25½ cents a pound.

Telford Taylor, head of new Small Defense Plants Administration, says a $100 million loan fund for small firms will be ready "soon." Steel producers will get all structurals they need for expansion in first quarter, 1952, says DPA.

Separate office of aluminum is established within DPA. Samuel W. Anderson is named deputy administrator to head new agency's drive to expand production facilities.

Nov. 14—OPS authorizes construction industry to adjust prices to reflect increased material and labor costs under a regulation effective Nov. 20.

Nov. 16 — President Truman accepts resignation of Eric Johnston, economic stabilization director, effective Nov. 30.

CIO steelworkers say a guaranteed annual wage is one of 22 contract demands approved by its policy group.

Nov. 19—North American Aviation announces a new non-military "atomic furnace" that releases 160 kilowatts eight hours a day, five days a week for ten years on a single charge of uranium.

Sears-Roebuck & Co. announces it will begin marketing a low-priced car, the "Allstate," made by Kaiser-Frazer through stores in 17 south and southwest states before Christmas.

Aircraft Behind Schedule

Nov. 24—DPA's Aircraft Production Board says production schedules have been lowered by shortages of machine tools and other materials.

Nov. 27 — CIO Steelworkers open negotiations with U. S. Steel on new contract to replace one expiring Jan. 1, 1952.

Roger Lowell Putnam, president of Package Machinery Co., Springfield, Mass., is named by President Truman to succeed Eric Johnston as economic stabilization director.

Nov. 28—Senate preparedness subcommittee urges appointment of a "defense production czar" to meet a "dangerous" lack in output.

OPS issues a simplified guide for firms making less than $250,000 in their latest fiscal year so they can raise prices under Capehart amendment.

McWilliams Dredging Co. signs a $15 million contract with U. S. Steel to dredge a 26-foot channel 170 miles up Macareo and Orinoco rivers so the steel company can sship iron ore from its new Venezuelan deposits.

Interior Department says the government's experimental alumina plant at Laramie, Wyo., will be completed and put into operation.

Nov. 30—Justice and Interior Departments disapprove plans advanced by Anaconda Copper to

Only
CARAVAN
AXLES...

Give you these features

Double-acting spring cushioned draw bar to minimize stopping and starting shock, positive trail at high speeds, maximum roadability on rough terrain, sturdy solid steel axle beam construction . . . these features combine to make CARAVAN units outstanding among axle assemblies.

In addition, CARAVAN axles are noted for versatility. They are suitable for use on all types of industrial, field-service, construction and military equipment . . . wherever dependable portability is needed.

Both single axle (2-wheel) assemblies and 4-wheel running gear equipped with automotive type steering are available to meet a wide range of requirements. Units of either straight or drop type construction can be supplied.

Write today for United's 12-page illustrated Catalog No. 101. In addition to specifications on the complete line of CARAVAN axles, it contains descriptions of automatic surge-control braking device, retractable third-wheel assembly and other CARAVAN accessories.

UNITED

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enter the primary aluminum production field.

OPS issues its Ceiling Price Regulation 98, effective Dec. 4, designed to eliminate "exorbitant middleman profits" by rolling back prices on most warehouse steel by $1 to $3 a ton.

DECEMBER

Dec. 3 David Austin, U. S. Steel, and J. V. Honeycutt, Bethlehem, tell Senate small business subcommittee that the steel industry is headed for overproduction. DPA Chief Fleischmann holds CMP is still needed.

DPA launches a survey of idle plants to mobilize them for defense work. Government says it will consider using facilities having value of over $1 million. Makers of refrigerators and other consumer durables are listed as likely beneficiaries.

Dec. 4 President Truman says he will investigate the dispute between DPA and the Interior Department over whether Anaconda Copper and Harvey Machine Co. should be allowed to produce aluminum at Kalispell, Mont.

Scrap Drive

DPA may take over scrap collection allocation if private efforts continue inadequate, says Manly Fleischmann.

Dec. 5 Magma Copper Co. reports it is negotiating with RFC for a loan that would make about $80 million available for finishing work on the San Manuel copper ore body near Tucson, Ariz. Company expects a yearly yield of 70,000 tons of refined copper.

Dec. 8 — Caterpillar Tractor gets fast tax amortization privileges on $59,693,126 it will spend for facilities at Peoria and Joliet, Ill.

Hudson Motor Car Co. says it will offer a new lightweight car next summer.

DPA rules structural steel allotments for public works cannot be increased before fourth quarter, 1952.

Dec. 12 Phil Murray summons top C.I.O. Steelworker policy makers to meet in Pittsburgh Dec. 17. The move was reported to be for purpose of reviewing progress of wage negotiations, but could lead to formal authorization of a steel strike.

Dec. 13 Government intervenes in the steel wage negotiations. Two federal mediators leave for Pittsburgh to take part in stymied talks between U. S. Steel and the union.

FASTER — LOWER COST FORMING in WIRE AND RIBBON-METAL

NOT THIS!

ON REGULAR PROGRESSIVE DIE PRESSES

..but THIS!

★NILSON 4-Slide

Cat: No. S-F-1

THESE FIGURES TELL THE STORY:

METHOD	NUMBER OF MACHINES	HORSE POWER	DAILY OUTPUT
Standard progressive die set up	4	7	50,000
★ Nilson 4 Slide Machine	1	2	148,000

Here's an actual instance where a manufacturer of electric switches tripled production on yoke springs — and cut costs way down!

NILSON 4-Slide FORMING MACHINE

•

TRIPLES PRODUCTION

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17 DIFFERENT MODELS!

Nilson Four-slides are built in many models to provide the most efficient production of formed parts of varying sizes made from coiled ribbon stock up to 2½", or coiled wire up to ½" in standard models.

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- Automatic chain-making machines.
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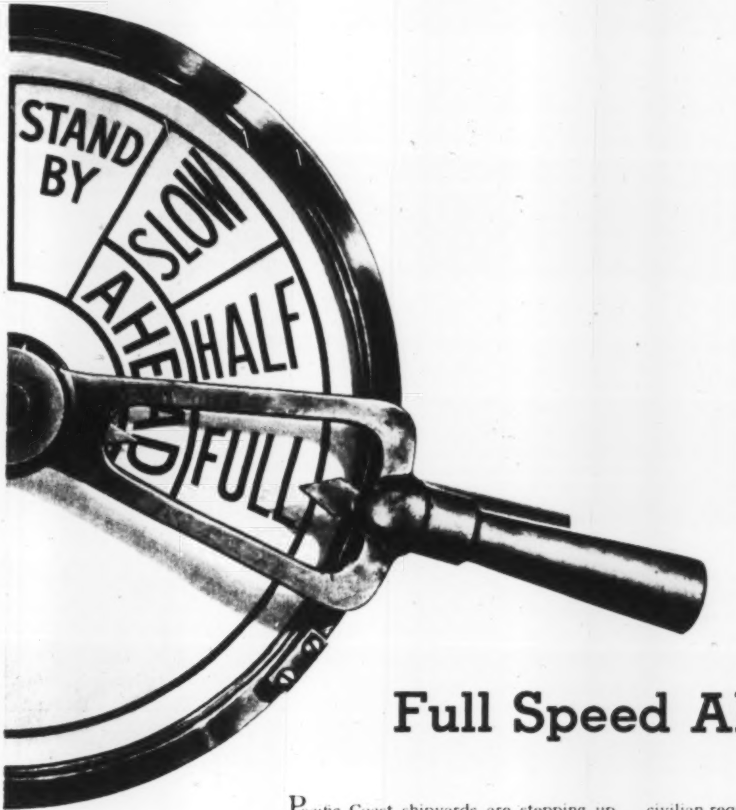

Full Speed Ahead

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Helping shipyards *and other industries* meet the demands of national security, Kaiser Steel is on a round-the-clock schedule to produce steel plate and other critically needed products.

Despite heavy requirements of the preparedness program, western manufacturers are still able to get steel for essential civilian requirements. One important factor has been the constant expansion of Kaiser Steel facilities.

A new open hearth furnace—Kaiser Steel's eighth—has raised ingot capacity to 1,380,000 tons a year—which is nearly 2½ times the amount produced by Kaiser Steel in 1944, the peak war year!

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DPA approves the plan of Anaconda and Harvey to build a plant in Kalispell, Mont. This overrules objections raised by Interior Secretary Chapman that such a move would tend toward monopoly for Anaconda in Montana.

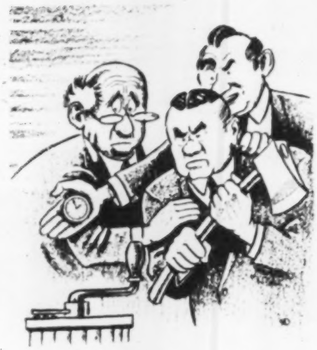
French National Assembly pledges the nation to join the Schuman Plan to run West Europe's coal and steel industries for 50 years.

Dec. 14—Economic Stabilizer Putnam rules the government will not permit the steel industry to raise prices to offset wage increases granted C.I.O. Steelworkers.

Dec. 17—Nationwide steel strike at midnight Dec. 31 "appears inevitable," says Philip Murray.

Dec. 18—DPA says certificates of necessity have been issued covering 23 million tons of added annual steel capacity since the start of the Korean war. The agency predicts these expansions will raise U. S. production past 120 million tons by 1954.

General Electric says it expects to make 75 per cent of the appliances it turned out in 1951 despite present and predicted shortages of critical metals.



When Should Controls End

Government summons negotiators from the steelworkers and management for conferences in Washington with Federal Mediator Cyrus Ching in an effort to head off the threatened New Year's Day strike.

Wage Stabilizer DiSalle reports no progress in talks with five steel company vice presidents on how much of a price increase the steel industry can get under the Capehart provision of the economic controls law.

Breakdown of first quarter steel allotments by DPA shows 40 per cent of carbon steel and about 60 per cent of all other types of steel, copper and aluminum will go for defense and defense-support production.

Dec. 21—Gas explosion in the Orient No. 2 Mine at W. Frankfort, Ill., kills 119 miners. Only four survive.

Dec. 22—President Truman refers steel wage dispute to Wage Stabilization Board and requests Philip Murray to postpone a strike until the board has an opportunity to act.

Dec. 24—The president says he will use any law on the books to avert a steel shutdown, indicating he may employ the 80-day Taft-Hartley Law injunction if the steelworkers refuse to await WSB action on the issues.

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CASTINGS ARE PERMANENT

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Calendar of Meetings—1952

JANUARY

January 8, Mining & Metallurgical Society of America: Annual meeting, Mining Club, New York. Society address: 11 Broadway, New York.

January 8-9, Power Crane & Shovel Association: Annual meeting, Washington. Association address: 74 Trinity Place, New York.

January 8-10, National Constructors Association: Annual meeting, Waldorf-Astoria Hotel, New York. Association address: 50 E. 41st St., New York. Secretary: C. B. Bronson.

January 13-15, Institute of Scrap Iron & Steel: Annual meeting and exhibit, Waldorf-Astoria Hotel, New York. Institute address: 1729 H St., NW, Washington. Executive vice president: Edwin C. Barringer.

January 14-17, American Management Association: General management conference, Biltmore Hotel, Los Angeles, Address: 330 W. 42nd St., New York.

January 14-17, Plant Maintenance Show: Convention Hall, Philadelphia. Manager: Clapp & Poliak Inc. Address: 341 Madison Ave., New York.

January 14-18, Society of Automotive Engineers: Annual meeting & engineering display, Hotel Book-Cadillac, Detroit. Society address: 29 W. 39th St., New York 18. Secretary: John A. C. Warner.

January 16-17, Steel Shipping Container Institute: Winter meeting, Pierre & Hampshire House, New York. Institute address: 600 Fifth Ave., New York 20. Secretary: L. B. Miller.

January 16-18, Society of Plastics Engineers: Annual meeting, Edgewater Beach Hotel, Chicago. Society address: 409 Security Bank Bldg., Athens, O.

January 16-18, Southern Industrial Distributors Association: Mid-year meeting, Edgewater Gulf Hotel, Biloxi, Miss. Association address: 208 Peachtree Arcade, Atlanta 3. Secretary: E. L. Pugh.

January 17, American Coke & Coal Chemicals Institute: Western regional meeting, Congress Hotel, Chicago. Institute address: 711 14th St. NW, Washington. Executive secretary: Samual Weiss.

January 17, Steel Shipbuilding Institute: Winter meeting, Hampshire House, New York. Association address: 600 Fifth Ave., New York.

January 18, Malleable Founders Society: Semi-annual meeting, Hotel Cleveland, Cleveland. Society address: 1800 Union Commerce Bldg., Cleveland. Secretary: Lowell D. Ryan.

January 18-19, American Medical Association, Council on Industrial Health: Annual meeting, William Penn Hotel, Pittsburgh. Association address: 535 N. Dearborn St., Chicago 10. Secretary: Dr. C. M. Patterson.

January 21-22, Industrial Furnace Manufacturers Association: Mid-winter meeting, Schenley Hotel, Pittsburgh. Association address: 420 Lexington Ave., New York 17. Secretary: V. P. Gopcevic.

January 21-24, American Roadbuilders Association: 50th anniversary meeting, Hotel Rice, Houston. Association address: 1319 F St. NW, Washington 4. Secretary & executive vice president: Lt. Gen. Eugene Reybold.

January 21-25, American Institute of Electrical Engineers: Winter general meeting, Hotel Statler, New York. Institute address: 33 W. 39th St., New York 18. Secretary: H. H. Henline.

January 23-24, National Industrial Conference Board: Winter meeting, Waldorf-Astoria Hotel, New York. Address: 247 Park Ave., New York 17. Assistant director, conference division: (Mrs.) I. E. Brown.

January 24-25, Steel Plate Fabricators Association: Annual meeting, Palmer House, Chicago. Association address: 37 W. Van Buren St., Chicago 5. Secretary: J. Dwight Evans.

January 27-31, Associated Equipment Distributors Association: Annual meeting, Hotel Conrad Hilton, Chicago. Association address: 360 N. Michigan Ave., Chicago. Secretary: P. D. Herman.

January 28-30, U. S. Bureau of Mines: International conference on underground gassification of coal, Birmingham and Gorgas, Ala. Co-chairmen: Dr. W. C. Schroeder, Bureau of Mines and Dr. M. H. Fies, Alabama Power Co., Gorgas, Ala.

January 28-30, Truck-Trailer Manufacturers Association: Annual meeting, Shamrock Hotel, Houston. Association address: 1024 National Press Bldg., Washington 4. Managing director: John B. Hulse.

January 31-February 1, American Society for Metals: Mid-winter meeting, William Penn Hotel, Pittsburgh. Society address: 7301 Euclid Ave., Cleveland 3. Secretary: W. H. Eisenman.

FEBRUARY

February 4, Cleveland Engineering Society: Annual machine design conference, society offices, 2136 E. 19th St., Cleveland 15, O. Secretary: Don Cornish.

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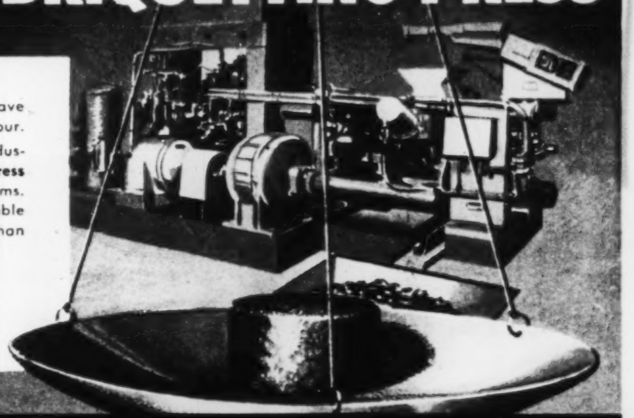

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February 7-8, Instrument Society of America, New York Section: Power plant symposium, Hotel Statler, New York. Society address: 551 Fifth Ave., New York 17. Secretary: Richard Rimbach.

February 11-15, National Sand & Gravel Association: Biennial meeting, Hotel Conrad Hilton, Chicago. Association address: 1325 E St. NW, Washington 4. Executive secretary: Vincent P. Ahearn.

February 12, Chamber of Commerce of the United States: National conference on labor relations, Pittsburgh. Chamber address: 1615 H St. NW, Washington 6. Executive vice president: Arch N. Booth.

February 14-15, Foundry Educational Foundation: Technical and university advisory committees conference, Hotel Statler, Cleveland. Foundation address: Terminal Tower, Cleveland 13, O.

February 16-21, Automotive Electric Association: Annual meeting, Edgewater Beach Hotel, Chicago. Association address: 800 Michigan Bldg., Detroit 26. Secretary: S. W. Potter.

February 18-20, National Crushed Stone Association: Annual meeting, Hotel Conrad Hilton, Chicago. Association address: 1415 Elliot Place NW, Washington 7. Administrative director: J. R. Boyd.

February 18-20, American Management Association: Personnel conference, Palmer House, Chicago. Association address: 33 W. 42nd St., New York.

February 18-21, American Institute of Mining & Metallurgical Engineers: Annual meeting, Hotel Statler, New York. Institute address: 29 W. 39th St., New York. Secretary: Edward H. Robie.

February 21-22, Society of the Plastics Industry (of Canada) Ltd.: Annual conference, Royal York Hotel, Toronto. Society address: 67 W. 44th St., New York 18. Executive vice president: William T. Cruse.

February 25-26, Materials Handling Conference: Purdue University, sponsor. Address: W. Lafayette, Ind.

February 28, Bituminous Coal Research Inc.: Annual meeting and exhibit, Edgewater Beach Hotel, Chicago. Address: 804 Southern Bldg., Washington 5. Secretary: C. A. Reed.

MARCH

March 3-7, American Society for Testing Materials: Spring meeting & committee week, Hotel Statler, Cleveland. Society address: 1916 Race St., Philadelphia. Secretary: C. L. Warwick.

March 4-6, Society of Automotive Engineers: National passenger car, body and materials meeting, Hotel Book Cadillac, Detroit. Society address: 29 W. 39th St., New York 18. Secretary: John A. C. Warner.

March 5, Manufacturers Standardization Society of the Valve & Fittings Industry: Annual meeting, Hotel Commodore, New York. Society address: 420 Lexington Ave., New York 17. Secretary: Lester W. Benoit.

March 10-14, National Electrical Manufacturers Association: Spring meeting, Edgewater Beach Hotel, Chicago. Association address: 155 E. 44th St., New York 17. Managing director: W. J. Donald.

March 10-14, National Association of Corrosion Engineers: Annual conference and exhibit, Hotels Buccaneer and Galvez and Galveston Municipal Pier, Galveston, Tex. Association address: 919 Milam Bldg., Houston 2. Secretary: A. B. Campbell.

March 11-14, Society of the Plastics Industry Inc.: National plastics exposition, Convention Hall, Philadelphia. Society address: 67 W. 44th St., New York 18. Executive vice president: William T. Cruse.

March 12-14, American Society of Training Directors: Annual conference, French Lick Springs Hotel, French Lick, Ind. Secretary: R. L. Moberly, University of Wisconsin, Madison, Wis.

March 16-19, American Institute of Chemical Engineers: Annual spring conference, Biltmore Hotel, Atlanta. Institute address: 120 E. 41st St., New York 17. Secretary: Stephen L. Tyler.

March 17-19, Midwest Conference on Fluid Mechanics: Ohio State university, Columbus, O. General conference chairman: Prof. A. N. Tifford, aeronautical engineering department, Ohio State university.

March 17-19, National Association of Waste Material Dealers Inc.: Annual meeting, Waldorf-Astoria Hotel, New York. Association address: 271 Madison Ave., New York. Secretary: Clinton M. White.

March 17-21, American Society of Tool Engineers: Annual meeting and Biennial industrial exposition, International Amphitheatre, Chicago. Society address: 10700 Puritan Ave., Detroit. Secretary: Harry E. Conrad.

March 18-19, Steel Founders' Society of America: Annual meeting, Edgewater Beach Hotel, Chicago. Society address: 920 Midland Bldg., Cleveland 15. Secretary: F. Kermit Donaldson.

March 20-21, Pressed Metal Institute: Spring technical meeting, Hotel Carter, Cleveland. Institute address: 13210 Shaker Square, Cleveland 20. Manager: Orrin B. Werntz.

March 23-27, Buffalo; March 30-April 3, Milwaukee—American Chemical Society: Annual spring meeting. Society address: 1155 16th St. NW, Washington 6. Executive secretary: Alden H. Emery.

March 24-26, American Society of Mechanical Engineers: Spring meeting, University of Washington, Seattle. Society address: 29 W. 39th St., New York 18. Secretary: C. E. Davies.

March 22-April 6, Chicago International Trade Fair: Navy Pier, Chicago. Executive director: John N. Gage, Col., U.S.A., Ret. Address: Merchandise Mart, Chicago.

March 24-28, National Association of Power Engineers Inc.: National power conference and exhibit, Hotel Sherman, Chicago. Association address: 176 W. Adams St., Chicago. Secretary: A. F. Thompson.

March 30-31, Packaging Machinery Manufacturers Institute: Semi-annual spring meet-

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ing, Hotel Dennis, Atlantic City, N. J. Institute address: 342 Madison Ave., New York 17. Secretary: Helen L. Stratton.

March 31-April 2, International Acetylene Association: Annual spring meeting, Hotel Claypool, Indianapolis. Association address: 30 E. 42nd St., New York 17. Secretary: H. F. Reinhard.

March 31-April 2, American Institute of Mining & Metallurgical Engineers: National open hearth conference, William Penn Hotel, Pittsburgh. Institute address: 29 W. 39th St., New York 18. Secretary: Ernest Kirkendall.

APRIL

April 1-3, Steel Shipping Container Institute: Annual meeting, Hotel Biltmore, Palm Beach, Fla. Institute address: 600 Fifth Ave., New York 20. Secretary: L. B. Miller.

April 1-4, American Management Association: National packaging exposition and conference, Atlantic City Auditorium, Atlantic City, N. J. Association address: 330 W. 42nd St., New York. Secretary: James O. Rice.

April 4-5, National Association of Cost Accountants: Regional cost conference, Indianapolis. Association address: 505 Park Ave., New York 22. Secretary: A. B. Gunnarson.

April 7-8, American Management Association: Production conference, Hotel Statler, New York. Association address: 330 W. 42nd St., New York. Secretary: James O. Rice.

April 7-9, American Society of Lubrication Engineers: Annual meeting, Hotel Statler, Cleveland. Society address: 343 S. Dearborn St., Chicago 4. Secretary: W. F. Leonard.

April 9, Cutting Tool Manufacturers Association: Spring meeting, Hotel Cleveland, Cleveland. Association address: 416 Penobscot Bldg., Detroit. Secretary: Emil Gairing.

April 9-11, Society of the Plastics Industry Inc.: Annual technical session, Reinforced Plastics Division, Edgewater Beach Hotel, Chicago. Society address: 67 W. 44th St., New York 18. Secretary: William T. Cruse.

April 18-19, Lead Industries Association: Annual meeting, Hotel Drake, Chicago. Association address: 420 Lexington Ave., New York 17. Secretary: Robert L. Ziegfeld.

April 18-19, National Association of Cost Accountants: Regional cost conference, Atlanta. Association address: 505 Park Ave., New York 22. Secretary: A. B. Gunnarson.

April 18-21, Grinding Wheel Institute: Spring meeting, The Homestead, Hot Springs, Va. Institute address: 2130 Keith Bldg., Cleveland 15. Secretary: Frank G. Gustafson.

April 21-22, American Coke & Coal Chemicals Institute: Eastern regional meeting, Westchester Country Club, Rye, N. Y. Institute address: 711 14th St. NW, Washington. Executive secretary: Samual Weiss.

April 21-22, American Zinc Institute Inc.: Annual meeting, Hotel Statler, St. Louis. Institute address: 60 E. 42nd St., New York 17. Secretary: Ernest V. Gent.

April 21-24, Society of Automotive Engineers: National aeronautic and aircraft engineering display, Hotel Statler, New York. Society address: 29 W. 39th St., New York 18. Secretary: John A. C. Warner.

April 21-25, American Institute of Steel Construction Inc.: Spring engineering conference, New York. Institute address: 101 Park Ave., New York 17. Secretary: L. Abbett Post.

April 27-May 1, American Ceramic Society: Annual meeting, William Penn Hotel, Pittsburgh. Society address: 2525 N. High St., Columbus, O. Secretary: Charles S. Pearce.

April 27-May 3, Concrete Reinforcing Steel Institute: Annual meeting, The Greenbrier, White Sulphur Springs, W. Va. Institute address: 38 S. Dearborn St., Chicago 3. Secretary: H. C. Delzell.

April 28-29, Association of Iron & Steel Engineers: Spring conference, Netherland Plaza Hotel, Cincinnati. Association address: 1010 Empire Bldg., Pittsburgh 22. Managing director: T. V. Ess.

April 28-30, Metal Powder Association: Annual spring meeting, Hotel Drake, Chicago. Association address: 420 Lexington Ave., New York 17. Acting secretary: Robert L. Ziegfeld.

April 28-30, Chamber of Commerce of the U. S.: Annual meeting, Chamber of Commerce Bldg., 1615 "H" St. NW, Washington 6. Executive vice president: Arch N. Booth.

April 30-May 4, Industrial Diamond Association of America Inc.: Annual meeting, Princess Hotel, Bermuda. Association address: 124 E. 40th St., New York. Secretary: Athos D. Leveridge.

MAY

May 1-7, American Foundrymen's Society: Annual meeting, Convention Hall, Atlantic City, N. J. Society address: 616 S. Michigan Ave., Chicago. Secretary: W. W. Maloney.

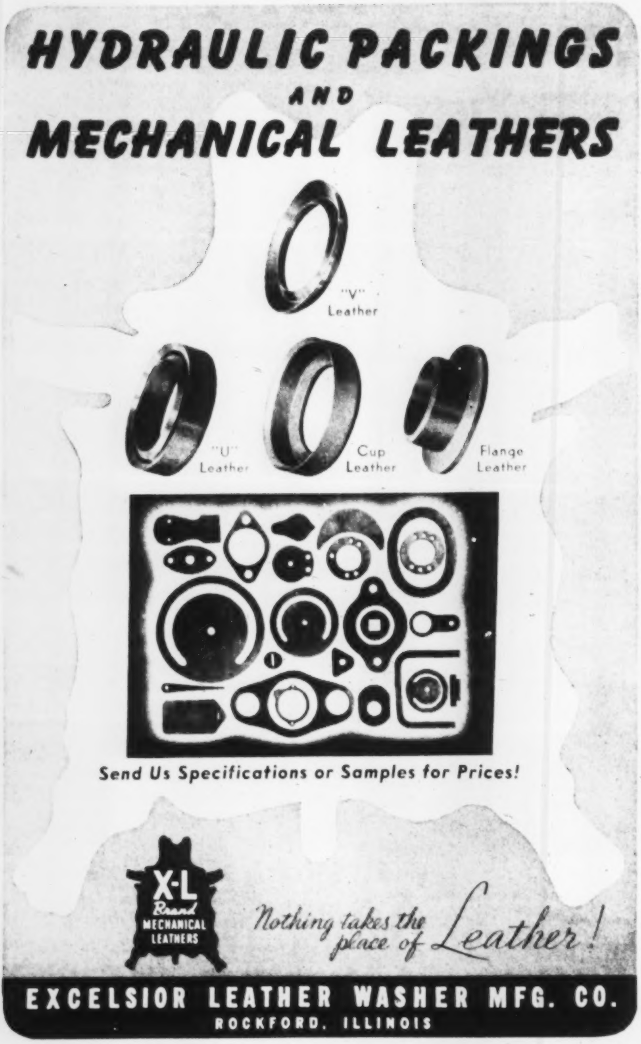
May 1-7, Annual International Foundry Congress & Exposition: Convention Hall, Atlantic City, N. J. Host: American Foundrymen's Society.

May 2-3, Industrial Fasteners Institute: Annual meeting, The Homestead, Hot Springs, Va. Institute address: 3648 Euclid Ave., Cleveland. Secretary: James D. Eggers.

May 4-8, Electrochemical Society Inc.: Semiannual meeting, Benjamin Franklin Hotel, Philadelphia. Society address: 235 W. 102nd St., New York 25. Secretary: Dr. Henry B. Linford.

May 5-7, Automotive Engine Rebuilders Association: Spring meeting, Hotel Plaza, San Antonio, Tex. Association address: 419 N. Capitol Ave., Indianapolis, Ind. Executive vice president: R. G. Patterson.

May 5-7, American Mining Congress: Annual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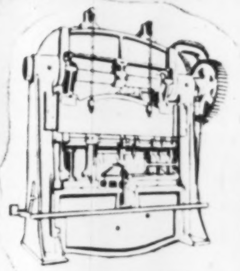
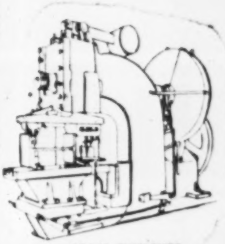
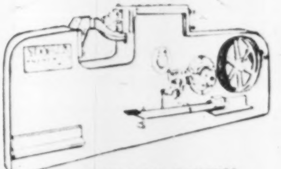


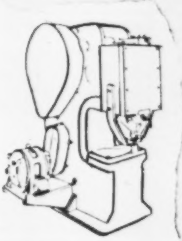
MULTIPLE PUNCHES



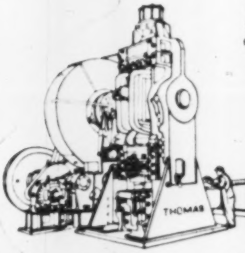
BEAM PUNCHES



HORIZONTAL PUNCHES



VERTICAL PUNCHES



BILLET SHEARS
8'' x 8''

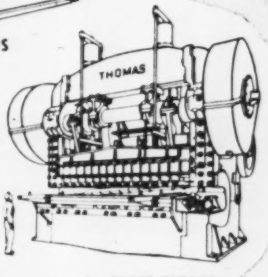
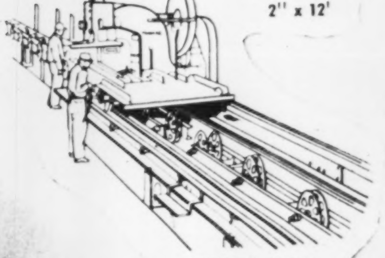


PLATE SHEARS
2'' x 12'



SPACING TABLES

30

spring meeting Netherland Plaza Hotel Cincinnati Congress address 1102 Ring Bldg, Washington 6 Secretary Julian B. Conover

May 6-8, National Highway Users' Conference: Highway transportation congress Washington Conference address National Press Bldg, Washington 4 Director Arthur C. Butler

May 6-9, Scientific Apparatus Makers Association of America: Annual meeting Edgewater Beach Hotel Chicago Association address 20 N Wacker Drive, Chicago 6 Secretary Kenneth Anderson

May 7-10, National Screw Machine Products Association: Annual spring meeting Hotel Chase St Louis Association address 13210 Shaker Square Cleveland 20 Executive secretary Orrin B. Werntz

May 8-9, The Wire Association: Spring meeting William Penn Hotel Pittsburgh Association address 453 Main St Stamford Conn. Executive secretary Richard E. Brown

May 11-14, American Institute of Chemical Engineers: Annual spring meeting French Lick Springs Hotel French Lick Ind. Institute address 120 E. 41st St. New York 17 Secretary Stephen L. Tyler

May 11-14, Industrial Furnace Manufacturers Association: Annual meeting The Homestead, Hot Springs, Va. Association address 420 Lexington Ave., New York 17 Secretary V. P. Gopcevic

May 12-14, Liquefied Petroleum Gas Association Inc.: Annual meeting and exhibit Palmer House Chicago Association address 11 S. LaSalle St. Chicago 3 Secretary Arthur C. Kreutzer

May 14-15, National Industrial Conference Board: Spring conference Waldorf-Astoria Hotel New York Address: 247 Park Ave New York 17 Assistant director, conference division (Mrs.) I. E. Brown

May 14-16, American Leather Belting Association: Spring meeting Skytop Lodge, Skytop Pa Association address 320 Broadway New York 7 Secretary E. R. Rath

May 18-21, Copper & Brass Research Association: Annual meeting and exhibit, The Homestead, Hot Springs, Va. Association address: 420 Lexington Ave., New York 17 Secretary: Bertram B. Caddle

May 19, Rail Steel Bar Association: Annual meeting General Brock Hotel, Niagara Falls, Ont. Association address: 38 S. Dearborn St., Chicago 3. Secretary: W. H. Jacobs.

May 19-20, American Steel Warehouse Association Inc.: Annual meeting, Waldorf-Astoria Hotel, New York. Association address 442 Terminal Tower, Cleveland 13. President: Walter S. Doxsey.

May 19-21, American Supply & Machinery Manufacturers Association: Annual convention and conference booth activity, Hotel Traymore, Atlantic City, N. J. Association address: 731-732 DuPont Circle Bldg. Washington. General manager: R. Kennedy Hanson.

May 19-21, National Industrial Distributors Association: Annual meeting, Atlantic City N. J. Association address: 1900 Arch St Philadelphia 3. Secretary: H. R. Rinehard

May 21-22, American Iron & Steel Institute: Annual meeting, Waldorf-Astoria Hotel New York. Institute address: 350 Fifth Ave New York 1. Meeting director: Frank Ragland

May 21-23, Gas Appliance Manufacturers Association: Spring meeting, The Broadmoor, Colorado Springs, Colo. Association address: 60 E. 42nd St., New York. Secretary: H. Leigh Whitelaw.

May 22-24, American Society for Quality Control: Annual meeting & exhibit, War Memorial Auditorium, Syracuse, N. Y. Society address: 70 E. 45th St., New York 17 Secretary: Alfred L. Davis.

JUNE

June 1-6, Society of Automotive Engineers: Summer meeting, Hotels Ambassador and Ritz-Carlton, Atlantic City, N. J. Society address: 29 W. 39th St., New York 18 Secretary: John A. C. Warner.

June 2-4, American Gear Manufacturers Association: Annual meeting, The Homestead Hot Springs, Va. Association address: 302 Empire Bldg., Pittsburgh 22. Executive secretary: John C. Sears.

June 5-7, Electric Metal Makers' Guild Inc.: Annual meeting, French Lick Springs Hotel French Lick, Ind. Address: Box 6026, Mt Washington Station, Pittsburgh. Secretary C. B. Williams.

June 9-21, International Organization for Standardization: Triennial meeting, Columbia university, New York. Secretary-general: Henri St. Leger, Geneva, Switzerland Host: American Standards Association, 70 E. 45th St., New York 17.

June 15-18, National Association of Cost Accountants: Annual international cost conference, Waldorf-Astoria Hotel, New York Association address: 505 Park Ave., New York 22. Secretary: A. B. Gunnarson.

June 15-19, American Society of Mechanical Engineers: Semi-annual meeting Hotel Sheraton-Gibson, Cincinnati. Society address 29 W. 39th St., New York 18. Secretary C. E. Davies.

June 16-17, Malleable Founders Society: Annual meeting, The Homestead, Hot Springs Va. Society address: 1800 Union Commerce Bldg., Cleveland. Secretary: Lowell D. Ryan

June 16-20, American Electroplaters' Society: Annual meeting and industrial finishing exposition, Hotel Conrad Hilton & International Amphitheatre, Chicago. Society address: Box 168, Jenkintown, Pa. Secretary: D. Gardner Foulke.

June 17-19, American Management Association: General management conference, Waldorf-Astoria Hotel, New York. Association address: 330 W. 42nd St., New York.

June 22-24, Alloy Casting Institute: Annual meeting, The Homestead, Hot Springs, Va Institute address: 32 Third Ave., Mineola N. Y. Secretary: E. A. Schoefer.

June 23-26, Radio-Television Manufacturers Association: Annual convention, Palmer House, Chicago. Association address: 777

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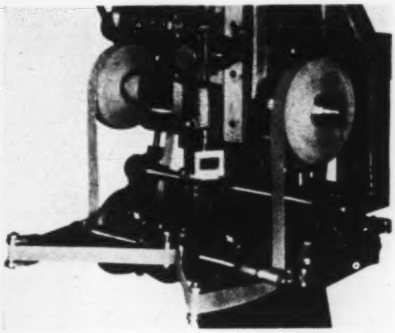
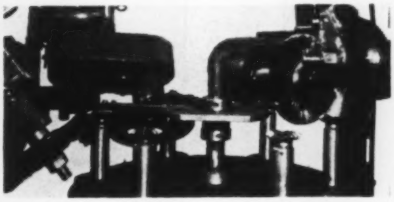


● Above: Close-up of ACME Jet Blade Polishing Machine for longitudinal polishing. Indexes blades from coarser to finer grit finishes. Made in various sizes. ACME Edging Machines (not illustrated) are available for automatic blending and polishing of leading edges of airfoil for jet blades.



● ABOVE: ACME 6 station, 4 head rotary wire brushing for pinion gears. Machines of this type available in various sizes and arrangements for defense production.

Acme Automatics cut cost and increase production on many operations such as radius blending, grinding armor plate, thread clearing, wire brushing, microfinishing and automatic rotary and continuous indexing of various operations, as well as on automatic polishing and buffing of all sizes and shapes of parts used in defense production.

Half a century of progressive experience and development in this specialized field of machinery design and manufacture enables Acme to serve you efficiently in supplying machine arrangements to meet the special demands of your production.

Close-up photos shown at left illustrate two of the many efficient ACME special arrangements that increase production and cut costs in defense production.

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14th St. NW, Washington 5. Secretary: James D. Secrest.

June 23-27, American Society for Testing Materials: 50th anniversary meeting and exhibit, Hotels Statler & New Yorker, New York. Society address: 1916 Race St., Philadelphia. Secretary: C. L. Warwick.

June 23-27, American Institute of Electrical Engineers: Summer general meeting, Hotel Nicollet, Minneapolis. Institute address: 33 W. 39th St., New York 18. Secretary: H. H. Henline.

June 29-July 2, National Industrial Advertisers Association: Annual meeting, Palmer House, Chicago. Association address: 1776 Broadway, New York. Secretary: B. G. Wiley.

JULY

July 25, Malleable Founders Society: Western sectional meeting, Drake Hotel, Chicago. Society address: 1800 Union Commerce Bldg., Cleveland. Secretary: Lowell D. Ryan.

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AUGUST

August 11-13, Society of Automotive Engineers: National West Coast meeting, Hotel Fairmont, San Francisco. Society address: 29 W. 39th St., New York 18. Secretary: John A. C. Warner.

August 19-22, American Institute of Electrical Engineers: Pacific general meeting, Phoenix. Institute address: 33 W. 39th St., New York 18. Secretary: H. H. Henline.

SEPTEMBER

September 3-13, Centennial of Engineering, Convocation Period: General manager, F. W. Edwards. Address: 57th St. & S. Shore Drive, Chicago 37.

September 4-6, American Institute of Chemical Engineers: Palmer House, Chicago. Institute address: 120 E. 41st St., New York 17. Secretary: Stephen L. Tyler.

September 8-10, American Standards Association: National standardization conference, Museum of Science & Industry, Chicago. Association address: 70 E. 45th St., New York 17. Secretary: G. F. Hussey Jr., Adm. U.S.N., Ret.

September 8-12, Instrument Society of America: Annual fall meeting and exhibit, Public Auditorium & Hotel Cleveland, Cleveland. Society address: 921 Ridge Ave., Pittsburgh 12. Secretary: Richard Rimbach.

September 9-11, Society of Automotive Engineers: National tractor meeting, Hotel Schroeder, Milwaukee. Society address: 29 W. 39th St., New York 18. Secretary: John A. C. Warner.

September 9-13, American Chemical Society, Chicago Section: National chemical exposition, Chicago Coliseum, Chicago. Address: 86 E. Randolph St., Chicago 1.

September 11, American Iron & Steel Institute: Regional technical meeting, Palmer House, Chicago. Institute address: 350 Fifth Ave., New York 1. Meeting director: Frank Ragland.

September 14-17, National Automatic Merchandising Association: Annual meeting and exhibit, Palmer House, Chicago. Association address: 7 S. Dearborn St., Chicago. Secretary: C. S. Darling.

September 14-18, Pressed Metal Institute: Annual fall meeting, Pocono Manor, Pa. Institute address: 13210 Shaker Square, Cleveland 20. Manager: Orrin B. Werntz.

September 14-19, American Chemical Society: Fall meeting, Atlantic City, N. J. Society address: 1155 16th St. NW, Washington. Executive secretary: Alden H. Emery.

September 14-20, Concrete Reinforcing Steel Institute: Semi-annual fall meeting, The Broadmoor, Colorado Springs, Colo. Institute address: 38 S. Dearborn St., Chicago 3. Secretary: H. C. Delzell.

September 22-23, Steel Founders' Society of America: Fall meeting, The Homestead, Hot Springs, Va. Society address: 920 Midland Bldg., Cleveland 15. Secretary: F. Kermit Donaldson.

September 22-24, National Truck Body Manufacturers Association: Annual meeting, Muehlebach Hotel, Kansas City, Mo. Association address: DuPont Circle Bldg., Washington. Secretary: Shipley D. Burton.

September 22-25, American Mining Congress: Annual fall meeting, Denver. Congress address: 1102 Ring Bldg., Washington 6. Secretary: Julian D. Conover.

September 29-October 2, American Institute of Steel Construction Inc.: Annual convention, Empress Hotel, Victoria, B. C. Institute address: 101 Park Ave., New York 17. Executive vice president: L. Abbett Post.

September 30-October 3, Association of Iron & Steel Engineers: Fall meeting and exhibit, Hotel Statler and Public Auditorium, Cleveland. Association address: 1010 Empire Bldg., Pittsburgh 22. Managing director: T. V. Ess.

OCTOBER

October 6-10, National Hardware Show: Grand Central Palace, Atlantic City, N. J. Managing director: Frank Yeager.

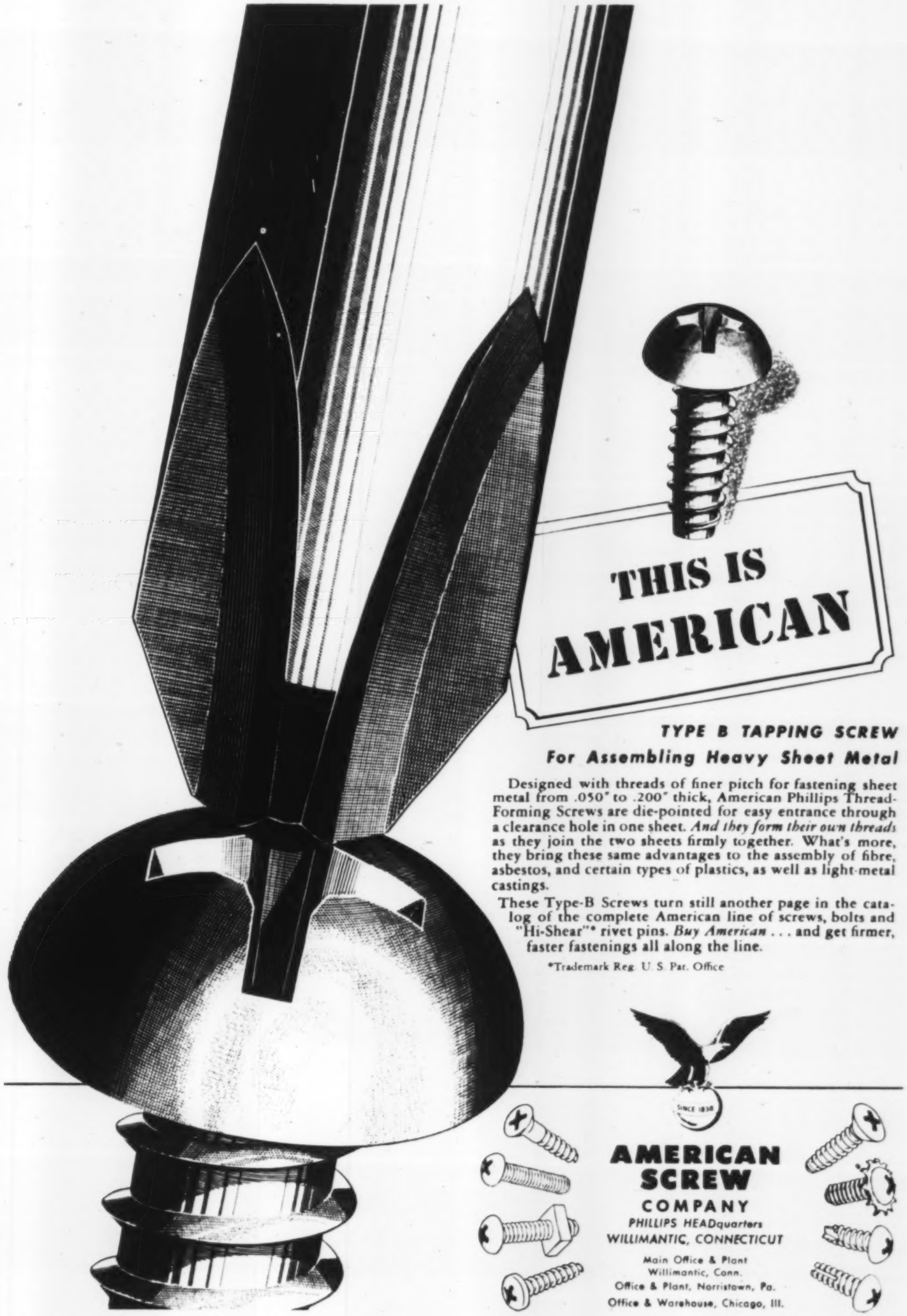
October 9, American Iron & Steel Institute: Regional technical meeting, William Penn Hotel, Pittsburgh. Institute address: 350 Fifth Ave., New York 1. Meeting director: Frank Ragland.

October 11-14, National Association of Waste Material Dealers Inc.: Fall meeting, Los Angeles. Association address: 271 Madison Ave., New York. Secretary: Clinton M. White.

October 13-17, American Institute of Electrical Engineers: Fall general meeting, New Orleans, La. Institute address: 33 W. 39th St., New York 18. Secretary: H. H. Henline.

October 16-17, Gray Iron Founders' Society Inc.: Annual meeting, Hotel Cleveland, Cleveland. Society address: 210 National City-E. 6th St. Bldg., Cleveland. Secretary: Donald H. Workman.

October 16-18, Foundry Equipment Manufac-



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turers Association: Annual meeting, The Greenbrier, White Sulphur Springs, W. Va. Association address: Engineers Bldg., Cleveland 14. Secretary: Arthur J. Tuscany.

October 18-19, American Society for Metals: Annual seminar, Benjamin Franklin Hotel, Philadelphia. Society address: 7301 Euclid Ave., Cleveland 3. Secretary: W. H. Eisenman.

October 19-21, Conveyor Equipment Manufacturers Association: Annual meeting, The Greenbrier, White Sulphur Springs, W. Va. Association address: No. 1 Thomas Circle, Washington 5. Executive vice president: R. C. Sollenberger.

October 20-22, Packaging Institute: Annual meeting, Hotel Commodore, New York. Institute address: 342 Madison Ave., New York 17. Secretary: L. V. Burton.

October 20-24, American Society for Metals: Annual meeting, Benjamin Franklin Hotel, Philadelphia. Society address: 7301 Euclid Ave., Cleveland 3. Secretary: W. H. Eisenman.

October 20-24, American Welding Society: Annual meeting, Bellevue Stratford Hotel, Philadelphia. Society address: 33 W. 39th St., New York 18. Secretary: J. G. Magrath.

October 20-24, Society for Non-Destructive Testing Inc.: Annual meeting, Philadelphia. Society address: Box 710, Evanston, Ill. Secretary: Philip B. Johnson.

October 20-24, American Institute of Mining & Metallurgical Engineers: Fall technical session, Philadelphia. Institute address: 29 W. 39th St., New York 18. Secretary: Edward H. Robie.

October 20-24, National Metal Congress & Exposition: Convention Hall, Philadelphia. Secretary: W. H. Eisenman, 7301 Euclid Ave., Cleveland 3.

October 22-24, Society of Automotive Engineers: National transportation meeting, William Penn Hotel, Pittsburgh. Society address: 29 W. 39th St., New York 18. Secretary: John A. C. Warner.

October 27-29, National Lubricating Grease Institute: Annual meeting, Edgewater Beach Hotel, Chicago. Institute address: 4638 J. C. Nichols Parkway, Kansas City 2, Mo. Executive secretary: Harry F. Bennetts.

October 27-29, American Gear Manufacturers Association: Fall meeting, Edgewater Beach Hotel, Chicago. Association address: 302 Empire Bldg., Pittsburgh 22. Executive secretary: John C. Sears.

October 27-30, American Gas Association: Annual meeting and exposition, Municipal Auditorium, Atlantic City, N. J. Association address: 420 Lexington Ave., New York 17. Secretary & convention manager: Kurwin R. Boyes.

October 27-31, Electrochemical Society Inc.: Fall meeting, Mt. Royal Hotel, Montreal. Society address: 235 W. 102nd St., New York 25. Secretary: Dr. Henry B. Linford.

October 30-November 2, National Tool & Die Manufacturers Association: Annual meeting, Hotel Sheraton, Rochester, N. Y. Association address: 906 Public Square Bldg., Cleveland. Executive secretary: George S. Eaton.

NOVEMBER

November 3-4, Society of Automotive Engineers: National diesel engine meeting, Hotel Chase, St. Louis. Society address: 29 W. 39th St., New York 18. Secretary: John A. C. Warner.

November 5-9, Scientific Apparatus Makers Association: Mid-year meeting, industrial instrument, laboratory equipment, optical, aeronautical and military instrument sections, The Homestead, Hot Springs, Va. Association address: 20 N. Wacker Drive, Chicago 6. Secretary: Kenneth Anderson.

November 6-7, Society of Automotive Engineers: National fuels and lubricants meeting, The Mayo, Tulsa, Okla. Society address: 29 W. 39th St., New York 18. Secretary: John A. C. Warner.

November 8-9, Open Steel Flooring Institute Inc.: Fall meeting, The Greenbrier, White Sulphur Springs, W. Va. Institute address: 2311 First National Bank Bldg., Pittsburgh 22. Secretary: Stuart J. Swensson.

November 10-13, The Wire Association: Annual meeting, Hotel Carter, Cleveland. Association address: 453 Main St., Stamford, Conn. Executive secretary: Richard E. Brown.

November 10-14, National Electrical Manufacturers Association: Annual meeting, Haddon Hall, Atlantic City, N. J. Association address: 155 E. 44th St., New York 17. Secretary: W. J. Donald.

November 14, American Iron & Steel Institute: Regional technical meeting, Hotel Mark Hopkins, San Francisco. Institute address: 350 Fifth Ave., New York 1. Meeting director: Frank Ragland.

November 19, American Standards Association: Annual meeting, Waldorf-Astoria Hotel, New York. Association address: 70 E. 45th St., New York 17. Secretary: G. F. Hussey Jr., Adm. U.S.N., Ret.

November 20-21, American Society for Personnel Administration: Fall meeting & exhibit, Hotel Schroeder, Milwaukee. Society address: 2917 E. 79th St., Cleveland. Secretary: Mary E. Hopkins.

DECEMBER

December 3, American Iron & Steel Institute: Regional technical meeting, Hotel Thomas Jefferson, Birmingham. Institute address: 350 Fifth Ave., New York 1. Meeting director: Frank Ragland.

December 3-5, American Leather Belting Association: Fall meeting, Hotel Commodore, New York. Association address: 320 Broadway, New York 7. Secretary: E. R. Rath.

December 7-10, American Institute of Chemical Engineers: Annual meeting, Hotels Carter & Cleveland, Cleveland. Institute address: 120 E. 41st St., New York 17. Secretary: Stephen L. Tyler.

December 11, American Iron & Steel Institute: Regional technical meeting, Hotel Warwick, Philadelphia. Institute address: 350 Fifth Ave., New York 1. Meeting director: Frank Ragland.

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Differential Air Dump Cars

Differential design and construction skillfully combine greatest strength with lightest possible weight. Saves motive power, fuel, maintenance. Dead weight is an enemy of economy. Differential makes the difference. But that isn't all!

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NEW DINGS MAGNETIC BRAKES HAVE HIGH THERMAL RATINGS

DIRECT-ACTING FOR AC OR DC MOTORS

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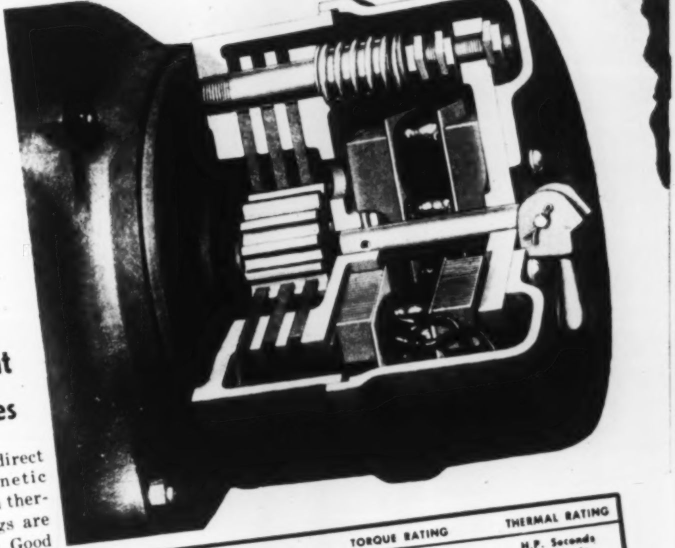

The new line of Dings direct acting, disc type magnetic brakes offers new highs in thermal ratings. These ratings are listed in the table at right. Good heat dissipation characteristics contribute greatly to the ability of the magnet coils to operate on a 24 hour per day basis without overheating. The combination of high thermal ratings and cool magnet operation increases the trouble-free life expectancy of Dings brakes.

There is no solenoid nor mechanical linkage between the magnet and the pressure plate. Spring tension engages the brake. Direct magnetic pull on the armature releases it. The brake is ruggedly constructed, compact, easily accessible for maintenance and is designed to mount easily on Nema Type C motor flanges. In adjusting, it is impossible for the operator to increase the torque beyond the ability of the magnet to release. An external manual release lever is incorporated. This mechanism automatically resets itself. For complete details, send for the new Brake Bulletin.

For NEMA Motor Frame	TORQUE RATING		THERMAL RATING H.P. Seconds per Minute	
	Lbs., Ft.	Duty	Cont. or Inter.	60 Minutes
203C-254C	10	Cont.	10	....
203C-254C	15	Inter.	10	15
203C-254C	25	Cont.	12	....
284C-326C	25	Cont.	14	....
284C-326C	35	Inter.	14	21
284C-326C	50	Cont.	16	....
284C-326C	75	Inter.	16	24
284C-326C	75	Cont.	18	....
284C-326C	90	Inter.	18	27

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STEEL Listens in-

(Continued from Page 126)

ernment official, believes that "industry definitely has too little contact with government. More business men ought to spend two or three years in government and preferably before the age of retirement." Mr. Reed—and most of the other men on the party line agree with him—charges that industry complains too much, but offers little active constructive help in government problems. He predicts a congressman or administrator would drop dead if a business man came in and said: "Mr. Jones, I haven't a thing to ask for, nor have I a gripe in my system, but here's a suggestion which might be helpful in solving a problem bothering both of us."

Mr. Reed says that if you're going to Washington, prepare your ground-work well. Know precisely what you want and whom you want to see. For his list of contacts, he has his personal acquaintanceship, the Congressional Directory and other references (See STEEL's Who's Who in the Defense Organization p. 143). He usually finds it more advantageous to go directly to Washington, rather than contact regional officials.

Regional Offices Help—Henry Goodrich, vice president of Rust Engineering Co., Birmingham, usually finds he can get good service from regional government officials. "I like the district offices," he says, "because they have been given wider powers and because the officials are generally much better acquainted with regional problems, conditions and needs."

Five Alabama purchasing agents believe that industry should develop a little more philosophic attitude toward today's controls. They think "the private enterprise system will prevail but with more regulation and more limitation on high profits. There will be more maintenance of established prices and less price competition. Some regulation of industry today is necessary under present complexities."

An eastern steel producer also advises industry to become resigned to some more-or-less permanent type of price control. Other means of competition—new manufacturing methods, better quality, improved services, faster deliveries—will have to supplant prices as a means of winning orders, that spokesman believes.

Necessity Mothers Progress—New—and more efficient—manufacturing methods may result when a company is forced to look for alternate materials, observes A. H. Behnke, vice president in charge of materials for Hotpoint Inc., Chicago.

That company has created a committee to study materials alternates on which the engineering, procurement and manufacturing departments are represented by their executive heads. "That committee is an executive must," he states, "because it is top management's responsibility to keep the company's operations co-ordinated and production maintained at the highest possible level."

Mr. Behnke believes that "a new review of present metallic requirements by NPA would result in a better balance in the allotment of metals for the dual economy." He also points out that the maximum use of materials can be achieved by keeping your operations as flexible as possible. Thus, if one material becomes short, the foresighted firm can shift for a while to another operation involving different materials.

Progress in Alternates—Stewart-Warner Corp., Chicago, is another firm that has taken a long look at alternate materials. Its director of purchases, Ephriam N. Osterberg, reports that steel has been substituted for brass and aluminum in a number of the company's products.

Many men on the party line point out that a company-level inventory of your position will reveal an occasional silver lining in the clouds on the horizon. Allen Vogeler of the Taft law firm in Cincinnati contends that the present high level of taxes, although bad, does not spoil all initiative. Because many worthwhile maintenance, development, public relations and other expenses are deductible, there's a helpful trend in that direction. But Mr. Vogeler does admit that "that type of spending when carried beyond the normal logical limits is most certainly economic waste."

Several accountants, while lamenting the vast amount of reporting to the government that's now required, also point out that the trend has forced many companies to adopt better accounting systems and to know more about the statistics of their business.

Where Are We Headed?—A company-level inventory may also remind management of some decisions that must be made soon. One issue to be faced forthrightly is this: Are we or are we not headed for an allout war? Do our political and military leaders think Russia can be contained without an allout war? You will have to decide those questions for yourself fairly soon because the answers have a strong bearing on economic decisions. If an allout war appears inevitable, the planners in business should pull out all stops on their expansions, their production. If a "containing" policy evolves, industry must be more cautious and face the possibility of a sharp recession in a year or two. None of the men on the party line sees much hope of allout peace, but they envision the danger of a fake peace—perhaps in 1952 if Korean truce talks ever are resolved favorably—that would throw to the winds our expensive industrial mobilization.

The voices on the party line are not in 100 per cent accord, but they show surprising unanimity on the four basic problems: The threat to incentives; the materials shortages; the problems of management and the problems of labor. They show substantial agreement that progress toward solving those four basic difficulties lies in honest inventories—from the company level to the highest national level—of our world political position, our materials resources, our psychological and moral strengths, and weaknesses. From the data developed in that top-to-bottom inventory we can set our goals, find new leadership, apportion our resources in an economy in which industry can take a more positive, constructive part.

How To Do Business Under Government Controls

(Continued from Page 137)

to make delivery to any one customer against authorized controlled materials orders totaling more than 10,000 pounds in any one week unless the order contains ten or more different items. Compulsory acceptance of ACM orders for delivery in one week to any one customer is limited to any one item of carbon steel weighing 8000 pounds or less; alloy steel, 5000 pounds or less; stainless bars and plates, 1000 pounds or less; stainless steel tubing or pipe, less than 1000 pounds or feet whichever is less.

Earmarking NPA reserves the right to earmark for special treatment specified steel products in inventories of distributors. This earmarking process is provided for in schedules to M-6A. The first and only schedule issued on Oct. 26, requires steel mills to accept orders from distributors of aircraft quality alloy steel for delivery in January, 1952, and in succeeding months equal to not less than 100 per cent of base tonnage shipped to the distributor during the base period.

High Priority Distributors are barred from making any deliveries of this steel unless it is required by specification and will be incorporated into aircraft, guided missiles or airborne equipment in connection with production, maintenance or repair or unless the steel is required under a program bearing allotment symbol E-2 (Atomic Energy Commission). Purchasers of this type of steel must provide a certificate to their distributor-suppliers. Sales by Canadian distributors are controlled by the Canadian government.

Sales by producers to distributors made prior to Jan. 1, 1952, were made pursuant to NPA Order M-6 and Directions 1-3 to that order. That order as amended Mar. 15, 1951, required producers to provide carbon steel products to the warehouses on the basis of 85 per cent of a warehouse's base tonnage of each product during the base period Jan. 1-Sept. 30, 1950.

At no time have warehouses been limited to acceptance of authorized controlled materials orders, but you can expect this to be changed.

Sulphur

USE of sulphur for producing carbon bisulphide and sulphuric acid is limited, under NPA Order M-69, as amended, to 90 per cent of each plant's use during calendar 1950. There is provision for making adjustments for plants supplying sulphuric acid for producing steel, nonferrous metals, petroleum, public health, agricultural insecticides and pesticides, synthetic rubber and military explosives.

Suppliers are barred from making deliveries except on specific authorization from NPA. Users are required to report monthly on consumption and inventories. Inventories are limited to a 25-day supply at regular rates of operation.

Strapping

USE of metal strapping for commercial purposes is limited to 14 situations under NPA Order M-59, issued May 1, 1951. Inventories are limited to a 45-day supply or a minimum of 1000 pounds. Licensed export orders and orders of the Armed Forces and the Atomic Energy Commission are exempt from use restrictions.

Tin

PIG TIN is allocated under NPA Order M-8. Use of pig tin with certain exceptions is limited to 90 per cent of average quarterly use during the six months ended June 30, 1950. Use of all forms of tin except solder for joining purposes is barred for some 23 purposes.

The order also provides specification controls and limits inventories of pig tin for tin plate to 120 days, pig tin for all other purposes to 60 days, lead base alloys to 45 days and all other materials and alloys containing 1.5 per cent or more tin to 60 days. An alternative formula is based on "practicable minimum working levels." Manufacturers are limited to the formula which would produce the smaller of the two inventories.

Tin Cans

ALL COMMODITIES packed in cans are divided into three classes under NPA Order M-25. Packers of perishable food commodities are given an unlimited quota of cans. Other food commodities and some industrial commodities are limited to a quota representing from 70 to 90 per cent of base period use (first half 1949, first half 1950). Unused portions of quotas have been carried over from quarter to quarter.

Because of current shortages Direction 2 will ban any carryover quota from 1951 to 1952. In addition, manufacturers are required to fill all orders representing can requirements for the calendar quarter under NPA directives and rated orders and for the basic quarterly quota of all customers. Whenever a can manufacturer is able to fill orders representing requirements under carry-over quotas, he is required to fill carryover orders on a ratable basis.

Present preferences are limited to filling of DO-rated orders and orders placed pursuant to NPA directives, although earlier versions of the order provided a preference to packers of perishable foods in instances where manufacturers were unable to fill orders.

Tool and High Speed Steels

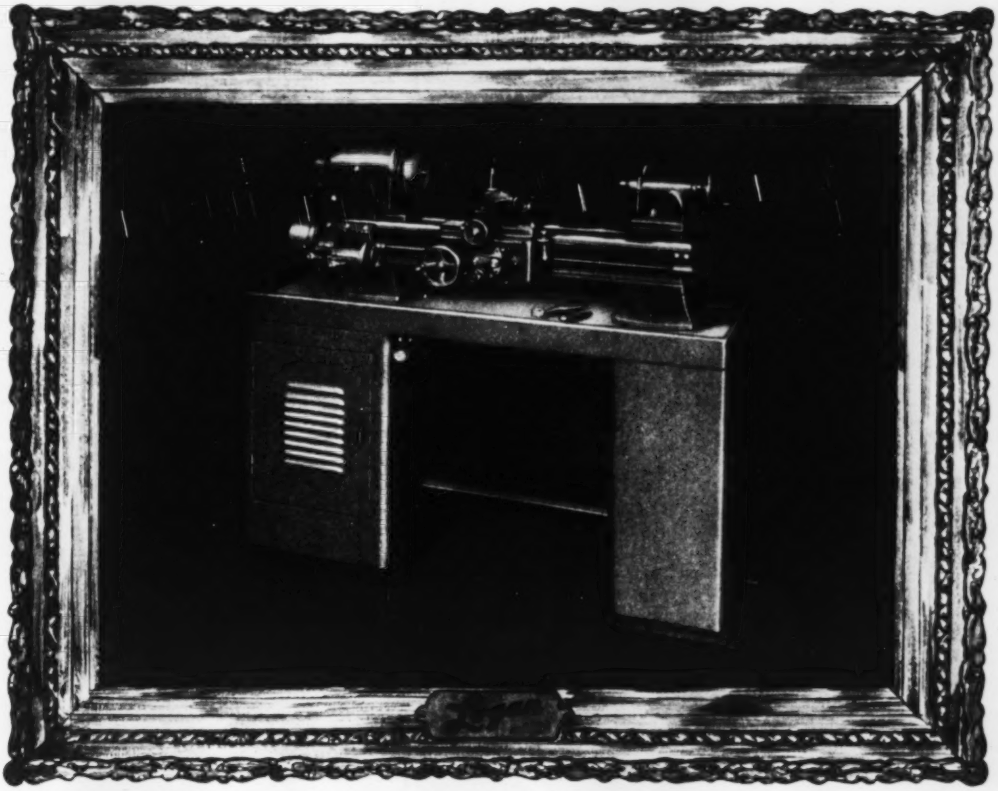
USE of tool and high speed steels is limited by Schedule B to NPA Order M-80. The restrictions are not applicable to carbon tool steel.

The schedule limits both the melting and ordering of Class B high speed steel to 20 per cent of the tonnage of Class A and Class B high speed steels which the processor is melting or the customer is ordering.

Use of tool steel in manufacture of tipped or welded tools or for hand tools such as chisels, pliers, wrenches, hammers, picks, screwdrivers, center punches or nail sets is barred. Class B high speed steel may not be used in the manufacture of hand hacksaw blades.

Tungsten

TUNGSTEN supplies are completely allocated under Schedule 3 to



PORTRAIT OF PRECISION

Logan No. 955
Quick Change Gear Lathe
11" Swing, 1" Collet Capacity,
1⅜" Spindle Hole

THE *Logan* LATHE of Lasting Accuracy

The accuracy you get in a new Logan Lathe is still there years afterward. That fact has been proved on production lines, in machine shops and tool rooms, and is being re-established every day. The reasons for lasting Logan accuracy are to be found in advanced Logan design and rugged, precise construction. Because the Logan ball bearing mounted spindle, for example, needs no adjustment for any speed from 45 to 1500 rpm, original accuracy is preserved. The two V-ways and two flat ways of the Logan bed are precision ground to a tolerance of .0005", and are warp-free. Rugged overall construction insures smoothness for accurate work, and durability under hard daily use. With its 11" swing, 1" collet capacity and 1⅜" spindle hole, the Logan Lathe can handle a high percentage of any shop's metal turning. And remember, no other lathe of comparable specifications can match the Logan in economy.

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LOOK TO LOGAN FOR BETTER LATHES AND SHAPERS

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NPA Order M-80. Allocation rules are not applicable to small users who will receive no more than 25 pounds from all sources.

Pure tungsten is subject to allocation under NPA Order M-81. Applications for allocation must be filed not later than 45 days before the first of the month in which delivery is required. NPA will forward allocation authorizations to a designated supplier ten days before start of the month in which delivery is to be made. Inventories are held to a 60-day supply.

Use of pure tungsten in manufacture of pigments of any type or as coloring or coating material for linoleum, rubber, paper of any kind, or grinding wheels is prohibited. The ban does not apply to the use of pure tungsten in manufacture of pigments for coloring used by the federal government in the making of currency, bonds, stamps, and other government securities. Neither does the ban apply to use in the making of printing inks or use by any person of not more than 50 pounds (tungsten content) for any purpose in any three-months period. Allocation requirements do not apply to the sale of pure tungsten welding rod by a person other than a pure metal processor.

Tungsten ore is under allocation by the Defense Minerals Administration under Metals Order No. 6 issued Apr. 6, 1951. The order requires monthly reports by processors.

Zinc

THE entire supply of slab zinc is allocated under NPA Order M-9, as revised on July 5, effective Aug. 1, 1951.

Applications for allocations must be filed on or before the 15th of the month and authorizations will provide for delivery in the following month.

Until Jan. 1, 1952, users of less than 20 tons monthly were exempt from the allocation requirements. After Jan. 1, 1952, users of more than 10 tons monthly must obtain an allocation authorization.

The Last Resort—NPA offers help in finding a home for allocation authorizations only when normal commercial domestic sources have been exhausted. Records must be maintained three years for inspection. Producers who have slab zinc available after the 10th of the month must notify NPA of the amount of production available.

Use of zinc is limited by NPA Order M-15, as amended June 15, 1951. The order limits use of zinc to 80 per cent by weight of average quarterly use during the base period (six months ended June 30, 1950). After July 1, 1951 use of special high grade zinc (99.99 per cent pure or better) is limited to 70 per cent of average quarterly use during the base period, other zincs to 80 per cent. Inventories are limited to a 30-day level.

No Tolls—Converting, remelting or other processing of zinc scrap under toll arrangements are barred under NPA Order M-37, issued Feb. 14, 1951, unless such agreements are approved by NPA. The order bars sale of slab zinc under conditions calling for return of zinc scrap. Inventories of zinc scrap in dealers' hands are limited to deliveries during the first six months of 1950 by weight divided by three. Galvanizers' dross may be used only for manufacture of zinc dust.

Toll arrangements for zinc ores are barred without prior written consent of the Defense Minerals Administration under Metals Order No. 3, issued Apr. 11, 1951.

NEMA Sees Good Year

Electrical machinery, equipment sales to hold near record 1951 volume

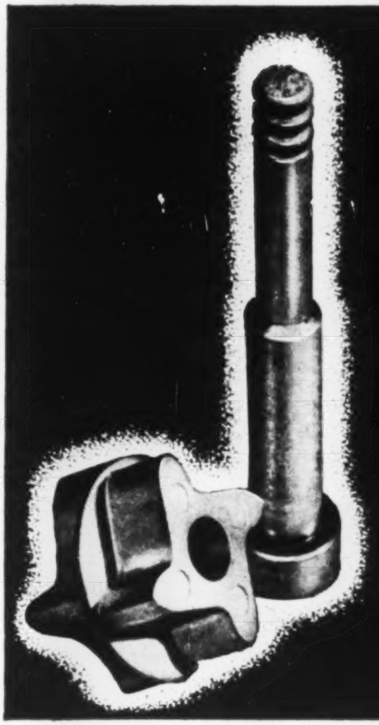
TOTAL sales of electrical appliances, machinery and equipment in 1952 will taper off only slightly from the all time sales peak of $12 billion set in 1951, says the National Electrical Manufacturers association, New York.

However, the electrical manufacturing industry, like all other industries, will produce in 1952 only those products that the mixed defense and nondefense economy will permit; for global defense planning and most government controls, together with the high taxes necessary to finance both, are likely to continue at least through the coming year.

Dislocations—Total business in the industry is expected to continue at a high level—but dislocations in the various branches of the industry will probably be greater than during the past year. In fact for strictly electrical products, 1952 will be more like the latter part of 1951. During that period the effects of material shortages, increased defense production, tightening of some governmental controls, loosening of other governmental controls, and new increases in federal taxes of all kinds, combined to create serious declines in those branches of the industry producing electrical appliances, illuminating equipment, and electrical building equipment and supplies.

Record Year—The industry as a whole shipped a greater volume of electrical products in 1951 than at any other time in its history, with total sales exceeding 1950, the previous peak, by 20 per cent, reaching a total volume of more than $12 billion.

Industrial apparatus, such as motors, welding equipment, industrial controls, etc., increased sharply over 1950 with shipments 50 per cent greater. Sales of insulating materials, like mica, porcelain, laminated products, vulcanized fibre, etc., were 40 per cent higher; and



17 TIMES

HARD'N'TUFF

The die cast zinc rotor shown (left) is subjected to a burnishing operation which removes .02 inches of stock. The tool used (right) normally produced from high speed and hard chrome steels was able to finish only 20,000 to 30,000 pieces before refinishing.

Because of alloy steel shortages and in an attempt to bring about an efficient increase in production the tool was cut from cold rolled steel and treated with HARD'N'TUFF. The user says: "It finally wore out after 500,000 pieces. It held its size all the time it was in use. Previous tools of high speed and hard chrome plate steel lasted approximately 20,000 or 30,000 pieces. What better recommendation could I give your material?"

Here is real proof that HARD'N'TUFF, the steel hardening compound that provides fast effective three-way action; — carburizing, nitriding, chromizing — can solve many part hardening problems.

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generation, transmission and distribution equipment volume was a third higher than in 1950.

Appliances Dip Sales of electrical appliances, on the other hand, which for the first six months of 1951 were 10 per cent above the sales for the same period in 1950, were, for the entire year 1951, 10 per cent less than 1950 sales. This reversal of trend was due largely to the severe decline in sales of refrigerators during the last few months of the year. Sales of this item for the first half of 1951 equaled the sales for the first half of 1950. However, sales for the entire year 1951 were 30 per cent less than the 1950 sales, indicating the heavy drop in sales during the last half of the year. Manufacturers of some of the newer appliances, like food waste disposers, dishwashers, and freezers, experienced heavy gains which bolstered the general appliance picture.

Lighting Up Illuminating equipment, exclusive of residential lighting showed an over-all increase in sales in 1951 of 40 per cent over 1950. However, this increase stood at 70 per cent for the first half of the year as compared with the first half of 1950, illustrating the decline during the latter months of 1951. Similarly, while electrical building equipment and supplies, including such items, as panelboards, fuses, wiring devices, etc., experienced an increase in sales in 1951 of 50 per cent over 1950 sales, the latter months of 1951 showed a growing decline in new business.

These adverse trends are accentuated as we look into 1952. It is expected that sales of electrical products in total will drop off about 5 per cent from the 1951 volume. Sales volumes will remain about the same or slightly higher for industrial apparatus, insulating materials, insulated wire and cable, and generation, transmission and distribution equipment.

Going Down All appliances, with the exception only of appliances of the commercial type, are expected to suffer a drop in sales varying between 10 per cent and 25 per cent from 1951, with an average drop of approximately 15 per cent. Illuminating equipment is expected to fall off in sales by approximately 20 per cent, and sales of electrical building equipment and supplies are expected to drop off 15 per cent in 1952. Automatic temperature controls and specialty transformers which registered appreciable increases in business during 1951 are also expected to show declines in sales for 1952 amounting to approximately 10 per cent from 1951 volumes.

Problems Aplenty

Gas appliance makers face materials, excise tax and demand difficulties in 1952

MANUFACTURERS of gas appliances and equipment have been studying every factor that concerns their business, and have been shaping their plans to meet the situation, says Gas Appliance Manufacturers Association. There are some clear indications of trends, possibilities and opportunities; there are problems aplenty. Some are common to all of the industry, and some are peculiar to individual manufacturers or groups of manufacturers. On the whole, prospects seem considerably brighter than they did a few months ago.

During a large part of 1951 inventories of all major appliances, gas and others, mounted dangerously, and there was a tremendous blast of price-slashing, give-aways, and generally demoralizing promotional activity. Inventories are now approaching a healthier state, and there are more indications of a good demand that should carry well into 1952 and provide an adequate selling opportunity for domestic gas appliances.

Market Recent surveys indicate that many householders are planning purchases of major appliances during the first half of the year. Dealers say people are buying again. And there's been a step-up in installment buying. This doesn't mean that selling will be a push-over, says GAMA, but it does mean that there is business to be done if the dealer will go out and do it.

Of course, every manufacturer faces the ogre of materials limitations. The seriousness of this situation should not be minimized. Thinking in terms of actual needs for new installations and modernization, it is likely that allocations will be somewhere near adequacy. There will be need for simplification, adjustment, conservation, says GAMA. But granting a determined effort to make the most of what's available, it looks as if producers of gas appliances and equipment will be able to fill orders within a reasonable period, at least through the first half of 1952.

Excises — About taxes, there's real cause for concern about excises that complicate the industry's efforts to move merchandise. GAMA members have done a strong job of placing the case before federal tax people, and some blessings have accrued, even though the excise tax still blankets most of the industry's production.

For a while it seemed the tax on gas ranges, water heaters and gas refrigerators would be increased to 25 per cent, however that was held to 10 per cent. The tax was removed from commercial cooking and water heating equipment, which may stimulate demand in this field. Offsetting that good, however, is the fact that gas clothes dryers are now, for the first time, subject to the 10 per cent tax.

Westinghouse Looks Ahead

Confident of its future, the company is chary of price controls and tax policies

STEADILY MOUNTING demands of defense production and a corresponding drop in consumer goods output will face the nation's industrial machine in 1952. So says Gwilym A. Price, president of Westinghouse Electric Corp. in a year-end statement. Two major problems of a garrison economy, Mr. Price believes, will be those of equitable price controls and sound taxation policies. Says Mr. Price: "Along with other manufacturers, Westinghouse is well aware of its corporate duty to produce to the limit those goods required by the military, and at the same time to fight inflation by keeping its prices at reasonable levels. But it fails to see how this can be achieved if costs for labor, mate-

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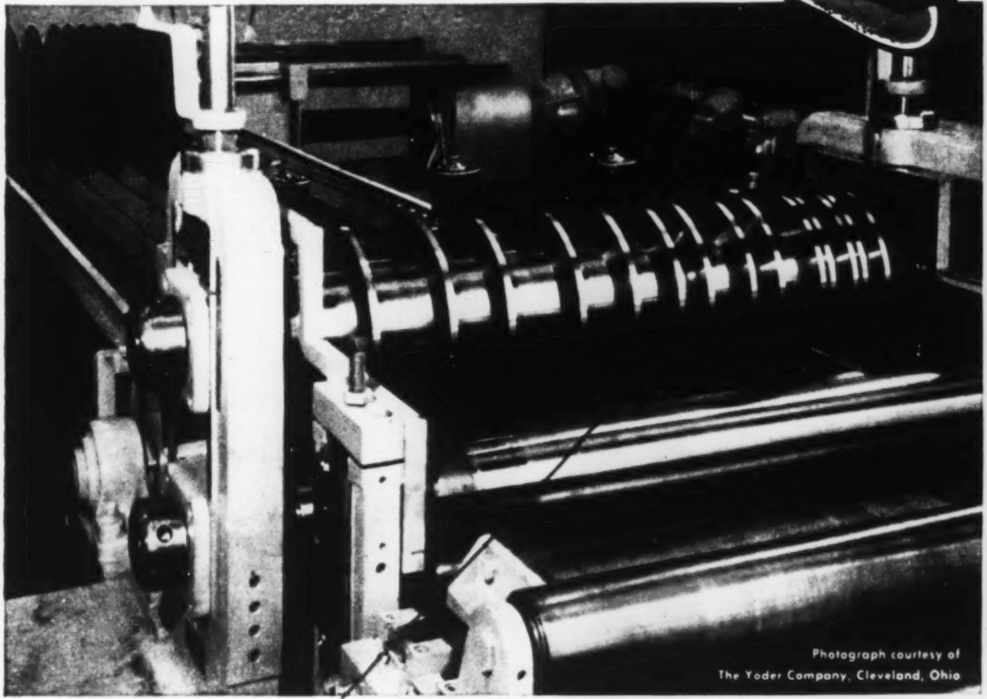

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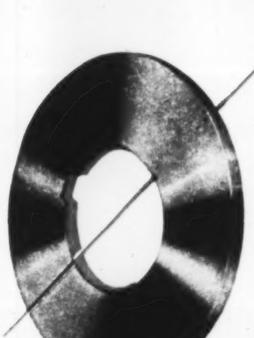

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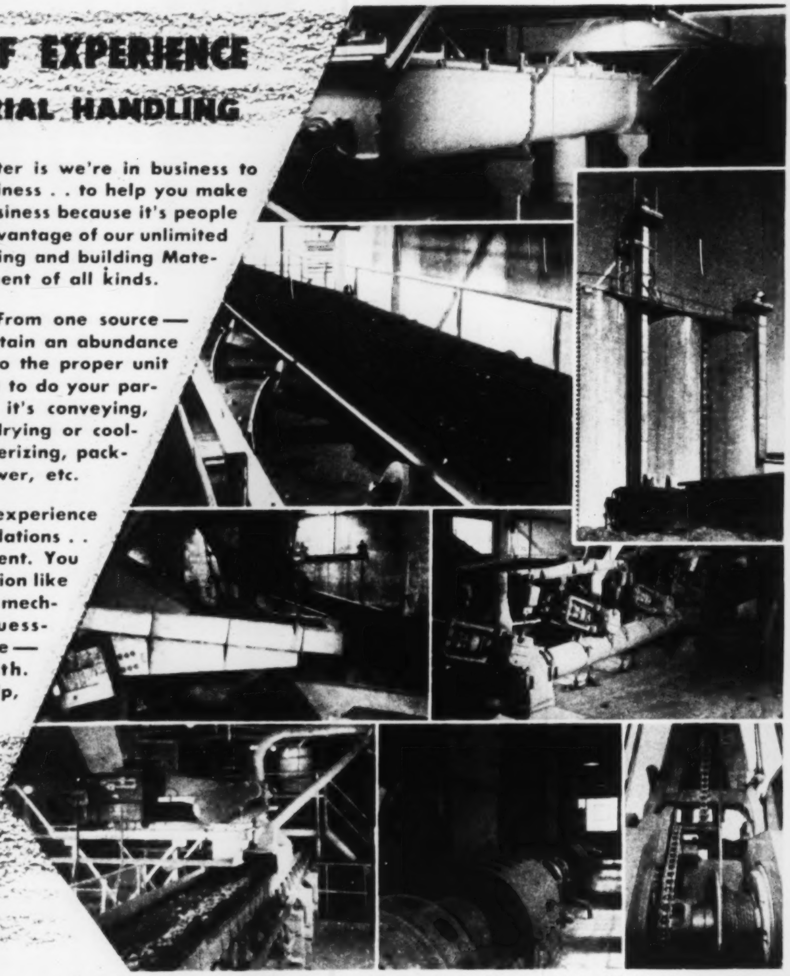

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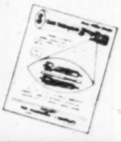

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rials, and services are not first controlled in the same measure as prices.

"Similarly, Westinghouse recognizes the need for additional corporate taxation to help bear the expense of the nation's defense program. But we question the wisdom of obtaining such funds by penalizing and thus discouraging the investment of new funds in industry."

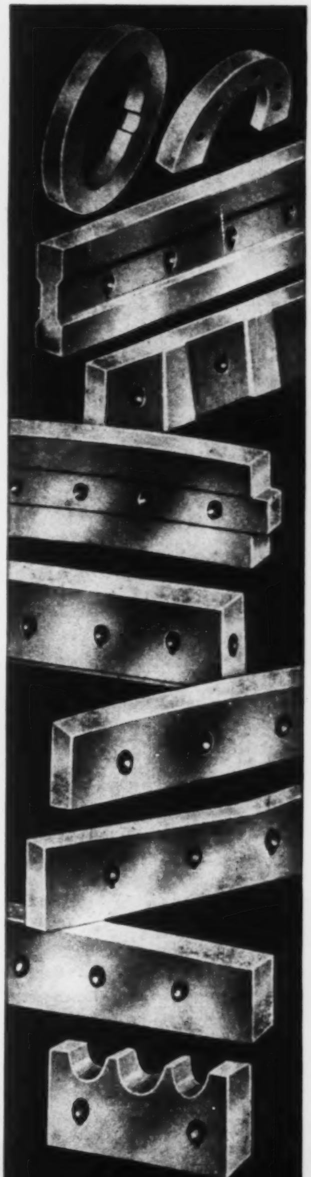
Noose Tightens—Trend toward more for the military and less for the consumer became increasingly apparent at Westinghouse in the last six months of 1951 as orders for military equipment of all kinds began to rise in volume and restrictions on the use of critical materials were made tighter and tighter. More than 40 per cent of the company's unfilled orders at the end of 1951 were for direct defense needs.

Despite these severe handicaps, production of consumer products during 1951 at Westinghouse was down only 10 per cent from the record year 1950. This was achieved mainly by the use of alternate materials, by design changes that required use of less critical items, and by reduction of scrap losses.

Even deeper cutbacks on civilian goods output will be called for during the first six months of 1952. But, barring all-out war, the situation should begin to improve by fall as supplier of copper, steel and aluminum become more readily available or other alternate materials are developed.

Customers — In dollar volume, Westinghouse production last year was well above the record of 1950. Apart from the substantial increase in military orders, considerable gains were made in sales to the electric utility, transportation, and steelmaking industries. The electrical industry has grown at a rate approximately three times faster than industry generally; and electric utility experts are confident that the demand for electricity will continue to move upward.

Westinghouse during 1951 undertook the largest expansion program of its history. A total of $296 million will be spent for the construction of new plants, for the enlargement of present facilities,



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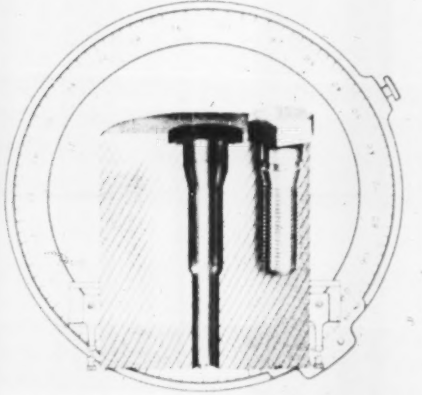

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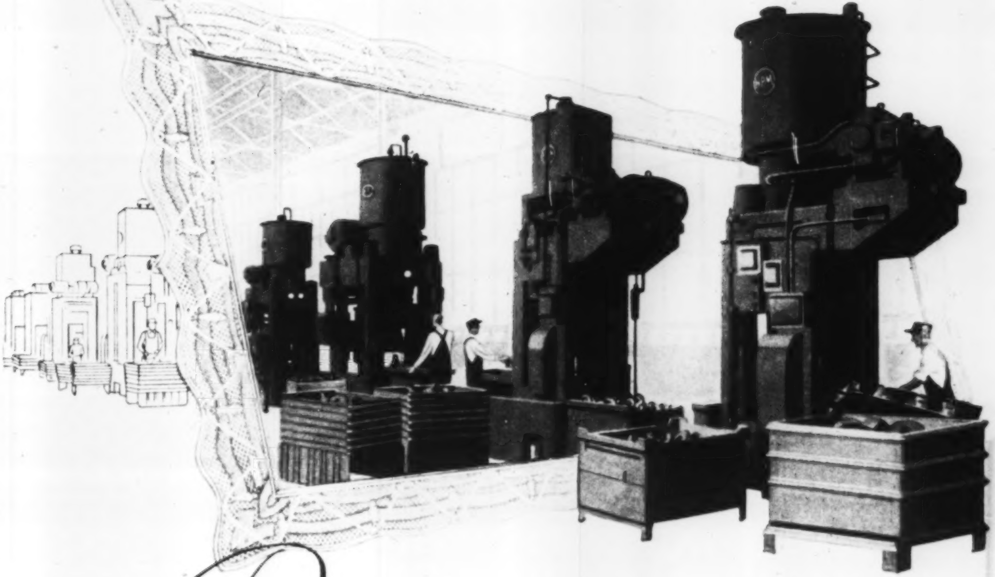
Ready—The new facilities will provide for increased output in jet engines, aircraft armament systems, electronic tubes, electric-power generating equipment, small motors, household appliances, radio and television sets, electric torpedoes, radar apparatus, aircraft parts, welding equipment, transformers, and many other products. Wherever possible, plants designated for defense production now will be utilized for civilian goods output when conditions permit.

Air-Arm — Significant progress was made during 1951 on many of the projects being undertaken for the armed services. Development of the world's first atomic-powered submarine moved forward with the award of a Navy contract for design and construction of the propulsion equipment. The 3000th turbo-jet engine to be produced by the company was delivered to the Navy in September. The backlog of orders for airborne electronic and special equipment expanded many-fold and led to the formation of a new Air-Arm division for the development and production of electronic aircraft equipment, including radar-directed fire-control systems and a new automatic pilot for jet fighters.

Many new developments were engineered to meet the nation's demand for electricity and power generation equipment. Turbine-generators ranging up to 200,000-kilowatt capacity — largest ever built—are now under construction. Research also led to a revolutionary new method of cooling power transformers, a method that employs the heat of vaporization principle and uses fluorocarbon liquids developed at the Westinghouse Research Laboratories. The new technique promises lighter, smaller, and hazard-free apparatus, and consequently more efficient distribution of electric power. Equally noteworthy was the development of a new cooling technique for turbine generators, that makes possible a 50 per cent output boost.



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"In our 20 year association with H-P-M, their responsibility has never been known to stop with the manufacture of the press . . . it is right there in our plant today, 'guaranteeing' performance on the production line. Responsibility . . . immediate emergency service . . . plus the fact that these presses have been operating 16 hours a day, with very little downtime is proof enough for me that our confidence in H-P-M and their products has not been misplaced."

Whatever your machine or production problem, you'll profit by the specialized experience and proven responsibility of H-P-M toward its products and its customers. Call us in at the planning stage, won't you?

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Reefs Ahead

The maritime fleet is larger now than a year ago, but the shallows of shortages are ahead

AMERICA'S merchant marine made vast and rapid mobilization progress during 1951, reports Vice Adm. Edward L. Cochrane, head of the Maritime Administration.

He says the United States today is operating on the seven seas the largest merchant fleet in its history, short only of that used on global supply lines during World War II. While describing the maritime industry as better able than ever before to meet its mounting responsibilities to defense, Admiral Cochrane added that perplexing and serious problems loom for the merchant marine.

Worsening Shortages—Number one obstacle confronting the shipping industry is the shortage of steel needed for the construction of new ships. While contracts have been let for the construction of 35 Mariner Class vessels, actual starts on 14 were temporarily postponed.

There is an urgent and increasing need for new petroleum carriers, not only for commercial use but also to provide more tanker tonnage which would be vitally necessary if international conditions worsen, Admiral Cochrane says.

The merchant marine needs additional passenger ship tonnage which could carry troops in times of emergency and which could be adapted for commercial use later.

With reference to the National Shipping Authority, Admiral Cochrane reports, "The movement of foreign economic and military aid cargoes in NSA ships operated by private steamship companies was at the rate of about 1 million tons a month since NSA was established in March."

Fleet Buildup—The total ocean-going vessels now carrying commercial cargoes or supplies destined for military and foreign aid use is placed at 2000. This compares with an active merchant fleet of 1248 ships one year ago.

Admiral Cochrane cites two developments as the prime accomplishments of the government's shipping agency during the past 12 months. These are the start of construction on the new-type speedy dry-cargo ships to be known as the Mariner Class and the establishment of the National Shipping Authority as a unit of the Maritime Administration.

Not Enough Brimstone

Despite record sulphur output in 1951, a member of the industry predicts worse shortages in '52

THE WORLD SHORTAGE of sulphur, which became pronounced as 1951 wore on, will become worse in 1952 as the rearmament program of the United States and its allies gains momentum, predicts L. M. Williams, Jr., president of Freeport Sulphur Company.

Despite record production by the American brimstone industry, discovery of a large new deposit and projects to develop three others, "any significant increase in the overall supply of sulphur is at least a year away," Mr. Williams said in an appraisal for the new year.

Record Production—U. S. production of sulphur in all forms in 1951 totaled approximately 6.2 million long tons. Of this amount, it is estimated that 5,325,000 tons was elemental sulphur or brimstone from Gulf Coast salt dome deposits, 200,000 tons was brimstone recovered from refinery and sour natural gases, 400,000 tons was sulphur in pyrites, and the remainder was sulphur obtained in other forms from smelter gases and other sources. Production in 1950 approximated 6 million tons.

Exports of crude sulphur in 1951 amounted to approximately 1.3 million long tons or almost 95 per cent of the 1950 total. The United Kindom was the recipient of the largest allocation. Its quota was approximately 400,000 tons compared with 420,000 tons in 1950.

Stockpiles are Low—In considering the outlook for 1952, Mr. Williams warned that stockpiles must not be further reduced. Stocks of mined brimstone, he said, are now at a level which is "a minimum for national security." At year's end, these represented about six months' inventory compared with a prewar peak of two years' supply.

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PERMACLAD stainless Clad Steel combines the surface characteristics of solid stainless with the easy forming qualities of mild carbon steel—provides corrosion resistance at lower cost.

ABRASIVE ROLLED STEEL FLOOR PLATE
A.W. ALGRIP Abrasive Rolled Steel Floor Plate is made by rolling tough abrasive grain as an integral part of the upper portion of steel plate. Result: Positive protection against slipping, even on steep inclines.

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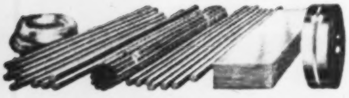

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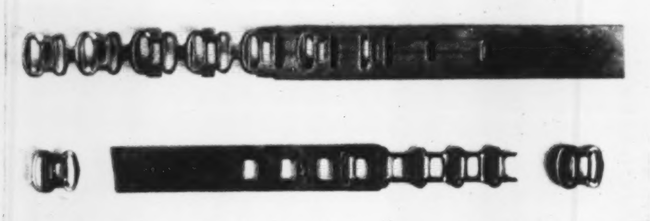


Top and bottom views of brass shoe buckle, with scrap strips from progressive dies which not only make body and slider but assemble them at center station. Courtesy Parva Products Inc., Mount Carmel, Conn.

Progressive Tools Reduce Costs on Buckle by Assembling Parts

High speed production, with a minimum of handling, is essential to hold down costs on highly competitive items such as the illustrated buckles used on shoes and clothing.

The buckle, shown from top and bottom with the scrap strips, is made from 0.040 in., $\frac{1}{4}$ hard cartridge brass (70% copper, 30% zinc) with an 0.035-0.040 grain size. This alloy has a high degree of workability and the grain size is held down to insure smooth finish to keep polishing costs at a minimum, yet give the desired workability.

The progressive die not only blanks, pierces and forms the two parts but assembles them without additional labor.

Two Coils Fed In

Two coils of cartridge brass, one 1" wide for the frame and the second $\frac{7}{8}$" wide for the slider, are fed into the die from opposite ends and the two parts made then assembled at the center of the tool.

With an operation such as this, 130 buckles a minute are produced.

Both sides have nine stations and at the tenth, or center station, each part is clipped and assembled. The completed buckle is blown out by air.

Frame, Slider Operations

Since there is one less operation of the slider, an additional blank pickup stage was inserted as a fourth station.

On the frame the operations are:

1. Pierce "d" hole.
2. Pickup for location "d" hole.
3. Pierce two holes.
4. Form lip.
5. Trim front.
6. Trim back.
7. Lance ears.
8. Bend ears.
9. Hold down station for clipping off part being assembled in 10th or center station.

On the slider the stages include:

1. Pierce "d" pickup hole.
2. Pickup "d" hole.
3. Pierce.
4. Blank station.
5. Form bearing lips.
6. Trim.
7. Finish trim.
8. Finish form slider.
9. Hold down for clipping and assembly.

The tools at the assembly station must be in perfect condition at all times as the ears must be bent around the slider to hold the two parts together and yet not be so tight that freedom of action is hindered.

The dies are made with cemented carbide inserts. The carbide reduces the chance of scoring and also gives longer life than the conventional tool steels, although high-chrome, high-carbon steel dies were originally used.

Sharp Dies Important

Sharp dies and punches are necessary at all times to keep burrs to a minimum to cut the tumbling and finishing time.

Some of the buckles are produced in separate dies and the parts are hopper-fed to the assembly tools. Production by this means is below the first-mentioned method.

From the assembly tools the buckles go to a coarse wet grind, fine grind and then burnishing. Then after special finishing operations they are plated and lacquered. (7761)

Various types of brass shoe and clothing buckles produced in progressive dies. Courtesy Parva Products, Inc., Mount Carmel, Conn.

CAUSES OF CORROSION

This article is one of a series of discussions by C. L. Bulow, corrosion metallurgist of the Bridgeport Brass Company.

DEZINCIFICATION CORROSION (Cont'd)

Arsenic Inhibits Dezincification in Well Water

Comparative tests have been carried out in well water to determine the effectiveness of arsenic and other elements as inhibitors of dezincification. Several groups of alloys (see Table I) were tested in a corrosive well water having the composition shown in Table II.

The results of corrosion tests after 120 days' exposure at 80 C are given in Table III. The data show that the relative effectiveness of arsenic varies greatly from one alloy to another in this particular water.

Except for the uninhibited Muntz metal, the rates of penetration based on loss in weight were essentially the same. The presence of arsenic in the brasses tested greatly reduced the rate of dezincification as shown in the last column of Table III.

Service tests have confirmed that a marked increase in life may be anticipated in applications where the arsenical brasses are used in fresh water in place of the non-inhibited brasses. Arsenical and other inhibited Admiralty brasses have almost completely displaced non-inhibited Admiralty in the form of heat exchanger and condenser tubing. It appears likely that the use of the arsenical brasses will be increased as their benefits become more widely recognized.

TABLE II
COMPOSITION OF CORROSIVE WELL WATER TESTED

Calcium	161.0 ppm
Magnesium	31.0 ppm
Sodium	28.3 ppm
Manganese	3.0 ppm
Copper	27.0 ppm
Chloride	206.0 ppm
Sulfide	0.0 ppm
Sulfate	303.0 ppm
Bicarbonate	16.1 ppm
Silica	27.0 ppm
Total Dissolved Solids	925.0 ppm
Total Suspended Solids	87.0 ppm
Free Carbon Dioxide	119.0 ppm
pH	5.35
pHs @ 20° C	8.5
$CaCO_3$ Saturation Index	3.2

TABLE I
COMPOSITION OF ALLOYS TESTED

Alloy	Cu	Zn	Al	As	Sn
Aluminum Brass	75.2	22.8	2.02	.000	.00
Arsenical Aluminum Brass	76.9	21.2	1.95	.019	.00
Admiralty	71.53	28.4	.00	.000	1.10
Arsenical Admiralty	70.94	27.8	.00	.032	1.29
Muntz Metal	61.94	37.82	.00	.000	.00
Arsenical Muntz Metal	60.99	38.60	.00	.21	.00

TABLE III
EFFECT OF ARSENIC AS AN INHIBITOR OF DEZINCIFICATION IN BRASSES TESTED IN HOT CORROSIVE WELL WATER (80° C)

Alloy	Rate of Corrosion Based on Loss in Weight	Rate of Corrosion Based on Loss in Tensile Strength	Depth of Dezincification
Aluminum Brass	.0024 ipy	0.46 ipy	0.46 ipy (plug type)
Arsenical Aluminum Brass	.0024 ipy	0.0015 ipy	Slight trace
Admiralty	.0039 ipy	0.0045 ipy	0.15 ipy (plug type)
Arsenical Admiralty	.0030 ipy	0.0088 ipy (pitting)	trace
Muntz Metal	.0284 ipy	0.129 ipy	0.46 ipy (general)
Arsenical Muntz Metal	.0029 ipy	0.0284 ipy (localized)	trace

NEW DEVELOPMENTS

This column lists items manufactured or developed by many different sources. None of these items has been tested or is endorsed by the Bridgeport Brass Company. We will gladly refer readers to the manufacturer or other sources for further information.

Metal-Fabricating Machine performs such operations as bending, folding, slot cutting, nibbling and louvering with proper tools and attachments. The 9/32 inch capacity machine has a throat clearance of 48 inches to facilitate handling of bulky pieces. Rapid setup is said to be possible without tools and wrenches because the machine has a quick-locking device on both circle and straight cutting attachments. **No. 1202**

Strip Metal Coil Grab facilitates crane lifting of coils up to 2000 pounds into vertical position. A tapered prong, which fits between coils in space made by bands, is positioned while opposite jaw is placed in center of coil. The grab automatically adjusts to coil size as the crane lifts, and the tapered prong slides between the coils. The grab then turns to move the coil into vertical position. **No. 1203**

Centrifugal Hand Tachometer provides six ranges in one instrument: 25 to 100, 75 to 300, 250 to 1000, 750 to 3000, 2500 to 10000 and 7500 to 30000 rpm. It is said to be completely protected against damage from overspeeding. **No. 1204**

Dial Tape Dispenser delivers moistened tape in any desired length. Operator selects length of tape by turning a telephone type dial. Tape from 1 to 3 inches in width can be used, in rolls up to 9 inches in diameter. The unit is powered by 110-v, 60-cycle alternating current and has a built-in water heater. The dispenser weighs 50 pounds, is 21 inches long, 9 inches wide and 10 inches high. **No. 1205**

Sweep-Type Press Guard consists of two arms that swing right and left as the press ram descends, clearing the entire work area before the ram has descended far enough to close on fingers or hands. With ram in the up position, both arms are suspended in front of the center of the bolster plate. The entire guard is mounted on a hinged bar which can be swung aside for changing dies or making adjustments. **No. 1206**

Barrel Finishing Paste is highly concentrated for use in finishing bronze, copper, gold and silver stampings, castings, machined and drawn parts. It reportedly can be used with or without media for finishing, and with certain non-ferrous media for roughing, deburring, cleaning and finishing in a single operation. **No. 1207**

Reducer Fitting allows easy joining of different sizes of tubing. In operation, the tubing is inserted into the reducer and the reducer nut tightened. Then the reducer is inserted into the fitting and the fitting nut tightened to complete the assembly. Heavy or thin wall tubing is reportedly held equally well. The reducer fittings are available in brass, aluminum, steel, stainless steel and Monel, and are made for use with tubing made of the same materials. Sizes range from $\frac{1}{8}$ inch to $\frac{7}{8}$ inch O.D. **No. 1208**

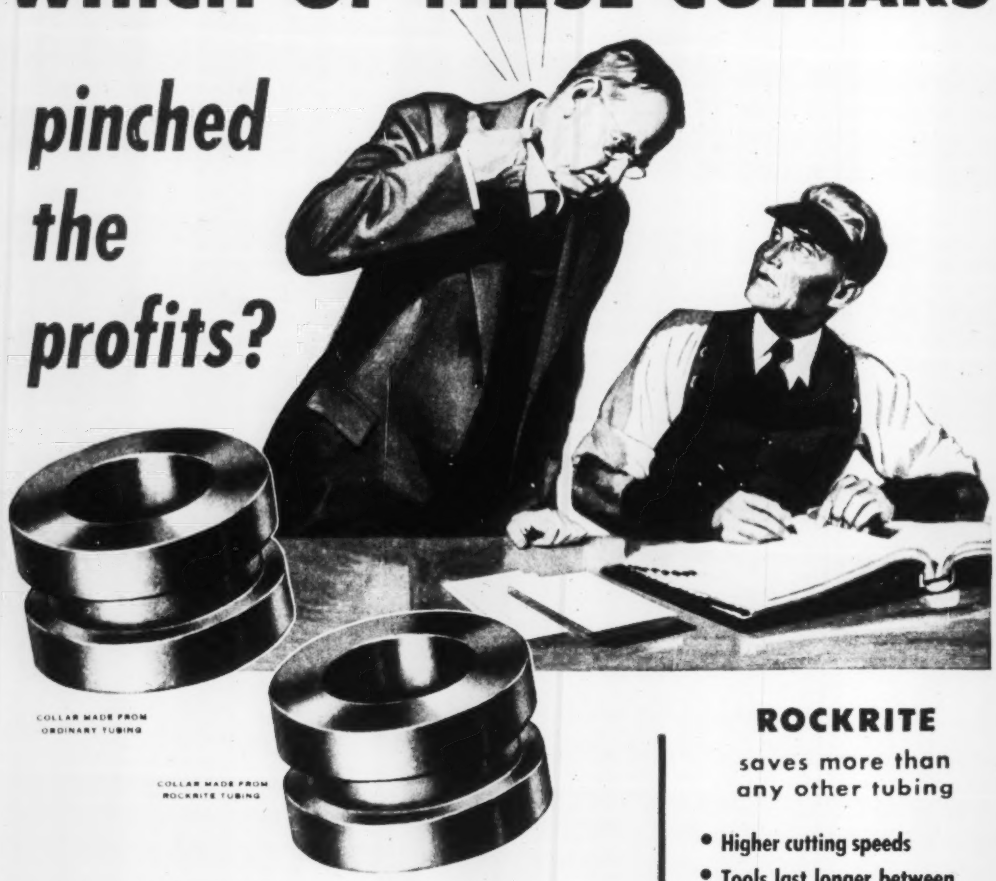
BRASS, BRONZE, COPPER, DURONZE, NICKEL SILVER, CUPRO NICKEL

BRIDGEPORT BRASS

BRIDGEPORT BRASS COMPANY, BRIDGEPORT 2, CONN. • ESTABLISHED 1865
Mills at Bridgeport, Connecticut, and Indianapolis, Indiana • In Canada: Noranda Copper and Brass Limited, Montreal
Warehouse Service with Slitting Facilities in Principal Cities

Advertisement

WHICH OF THESE COLLARS *pinched the profits?*


COLLAR MADE FROM ORDINARY TUBING
COLLAR MADE FROM ROCKRITE TUBING

These collars may look like twins, but they don't appear that way in the cost ledger. The cost of the part made from Rockrite Tubing is 1.4¢. The collar machined from ordinary tube stock costs 2.6¢. The squeeze on profits? 1.2¢ per part.

Sized by a distinctively different process to much closer tolerances than are practical by any other method, Rockrite Tubing requires less machining. Cutting speeds can be higher, parts are finished faster. Rockrite's better work-surfaces often eliminate need for additional finish cut. ● On collars and scores of similar parts, it's good business to pinch pennies and produce more profits.

ROCKRITE

saves more than any other tubing

- **Higher cutting speeds**
- **Tools last longer between grinds**
- **Work-surface finishes are better**
- **Machined parts have closer tolerances**
- **Stations on automatics are often released for additional operations**
- **Extra-long pieces available—less downtime for magazine stocking and fewer scrap ends**
- **Closer tolerances often eliminate necessity for machining on outside or inside**

ROCKRITE TUBING

TR 12TA

If you want to "size up" close tolerance Rockrite Tubing, write for Bulletin R-2 today.

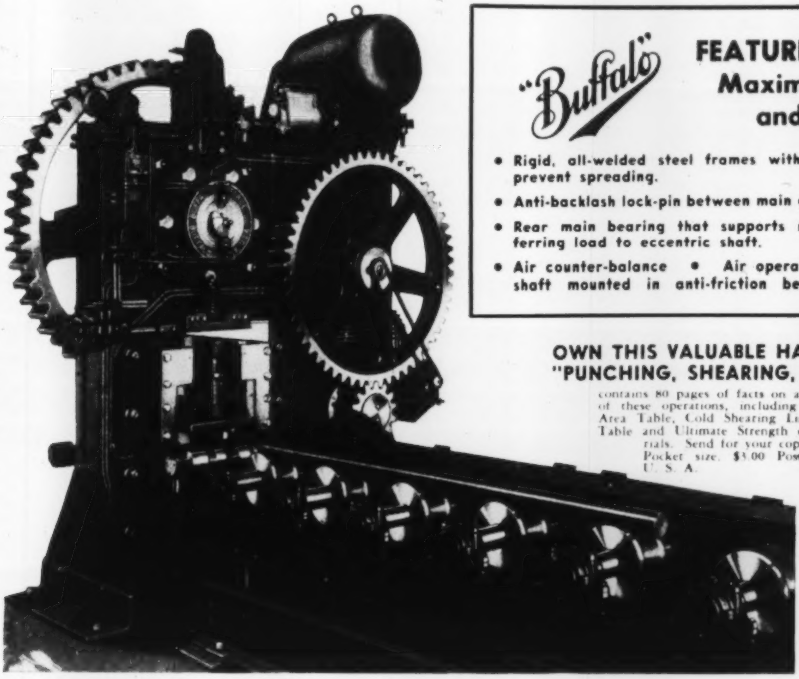
TUBE REDUCING CORPORATION • WALLINGTON, NEW JERSEY

"Buffalo"

Tips on Shearing

Selecting The Right BILLET SHEAR

1. DETERMINE CAPACITY REQUIRED—choose a shear that is not only adequate for present, but also any foreseeable future needs. This can save you money in the long run.
2. HOT OR COLD SHEARING? Tough and brittle alloys must be heated or they will crack and shatter under pressure.
3. CONSIDER NATURE OF MATERIAL TO BE SHEARED — specify tensile strength and Brinell hardness.
4. GIVE ALL INFORMATION on knife openings—shape of material to be sheared—electrical characteristics for motor and controls—any extras required for the production and service you must have (such as power feed table, automatic hold-down, cut-off gauge, etc.)
5. INSIST ON TROUBLE-FREE DESIGN. Shear shutdowns are expensive. Sturdy, rigid design for the intended shearing service will pay over and over in uninterrupted production.



"Buffalo"

FEATURES That Insure Maximum Stability and Service—

- **Rigid, all-welded steel frames with ties through plunger to prevent spreading.**
- **Anti-backlash lock-pin between main gear and clutch.**
- **Rear main bearing that supports main gear without transferring load to eccentric shaft.**
- **Air counter-balance** • **Air operated hold-down** • **Drive shaft mounted in anti-friction bearings.**

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contains 80 pages of facts on all phases of these operations, including Sheared Area Table, Cold Shearing Limitations Table and Ultimate Strength of Materials. Send for your copy today! Pocket size. $3.00 Postpaid in U. S. A.

"Buffalo" No. 11 Billet Shear with automatic feed table. Machine shears $4\frac{1}{2}$" rounds.

"Buffalo" MACHINE TOOLS

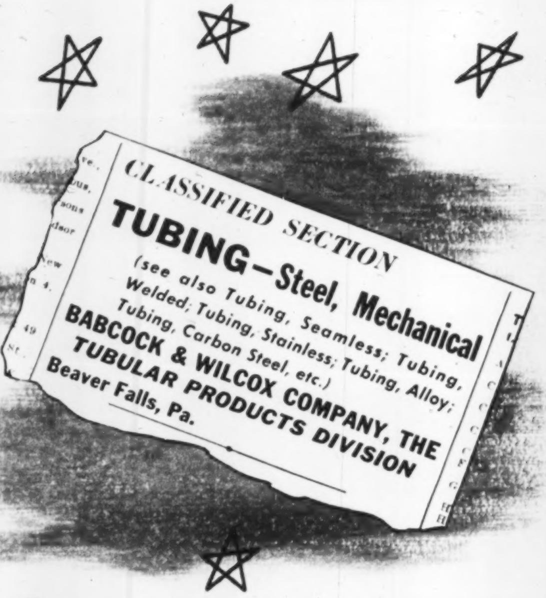
BUFFALO FORGE COMPANY

158 MORTIMER STREET BUFFALO, NEW YORK

Canadian Blower & Forge Co., Ltd., Kitchener, Ont.

DRILLING PUNCHING SHEARING CUTTING BENDING

take a CLOSER LOOK at...

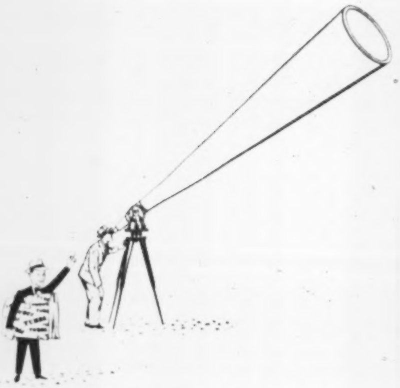


CLASSIFIED SECTION

TUBING—Steel, Mechanical

(see also Tubing, Seamless; Tubing, Welded; Tubing, Stainless; Tubing, Alloy; Tubing, Carbon Steel, etc.)

BABCOCK & WILCOX COMPANY, THE
TUBULAR PRODUCTS DIVISION
Beaver Falls, Pa.



for:

1. Seamless and welded Tubing.
2. Hot-finished, hot-rolled, cold-drawn or cold-rolled, and "Roto-Rocked" tubing.
3. Wide choice of Carbon, Alloy, and Stainless grades.
4. Sizes up to 9⅝" OD in full range of wall thicknesses.
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6. Unannealed, annealed, tempered, normalized, or otherwise heat-treated conditions, as required.
7. Wide choice of surface finishes—as rolled, as drawn, as welded, flash removed, turned, scale-free, and polished.
8. Round, square, rectangular, oval, and other shapes.
9. Specialty fabrication such as upsetting, expanding, bending, safe-ending, and machining.

Because steel tubes are critical materials, ask Mr. Tubes—your B&W Tube Representative—to help you determine the best available kind for your requirements. He may be able to save you time and material.

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TUBULAR PRODUCTS DIVISION
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Alliance, Ohio—Welded Carbon Steel Tubing
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Chicago 3, Ill. • Cleveland 14, Ohio • Denver 1, Colo.
Detroit 26, Mich. • Houston 2, Texas
Los Angeles 15, Cal. • New York 16, N. Y.
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B&W
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TUBES!

TA-1604M

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CINCINNATI, OHIO

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Save on payroll investment. One man is in charge of every job from the operator's seat. Smaller crews mean smaller costs — and a Lorain Crane's efficiency never varies with the hour or the weather.

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Buckets, magnets, slings, grabs — everything to handle any size, shape or type of material — from sand to steel. 15 or more attachments can be used with any Lorain Crane — up to 45-tons lifting capacity.

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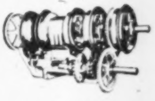
Here's rubber-tire mobility that goes places — any place around your yard or plant — you're not "chained to tracks". Materials move when and where you need them. Crawler mountings also available.



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You, too, can cut costs on every material handling job around your plant with a Lorain Self-Propelled Crane or one of the many other sizes and types of cranes Lorain builds. A one-man, mobile, rubber-tire crane such as Steelcraft uses can bring you new economies not possible otherwise. And you can perform scores of additional operations — such as, excavation, steel erection, plant maintenance, yard work and construction for additional savings. Uses are unlimited ... and there's a savings on every use ... every job.

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THE THEW SHOVEL CO., LORAIN, OHIO

THEW LORAIN LORAIN **CRANES FOR INDUSTRY**

Always something

THIS BELT [illegible]

which definitely [illegible] belt when heavy grinding pressure is applied. Proper [illegible] [illegible]

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division of NORTON Company

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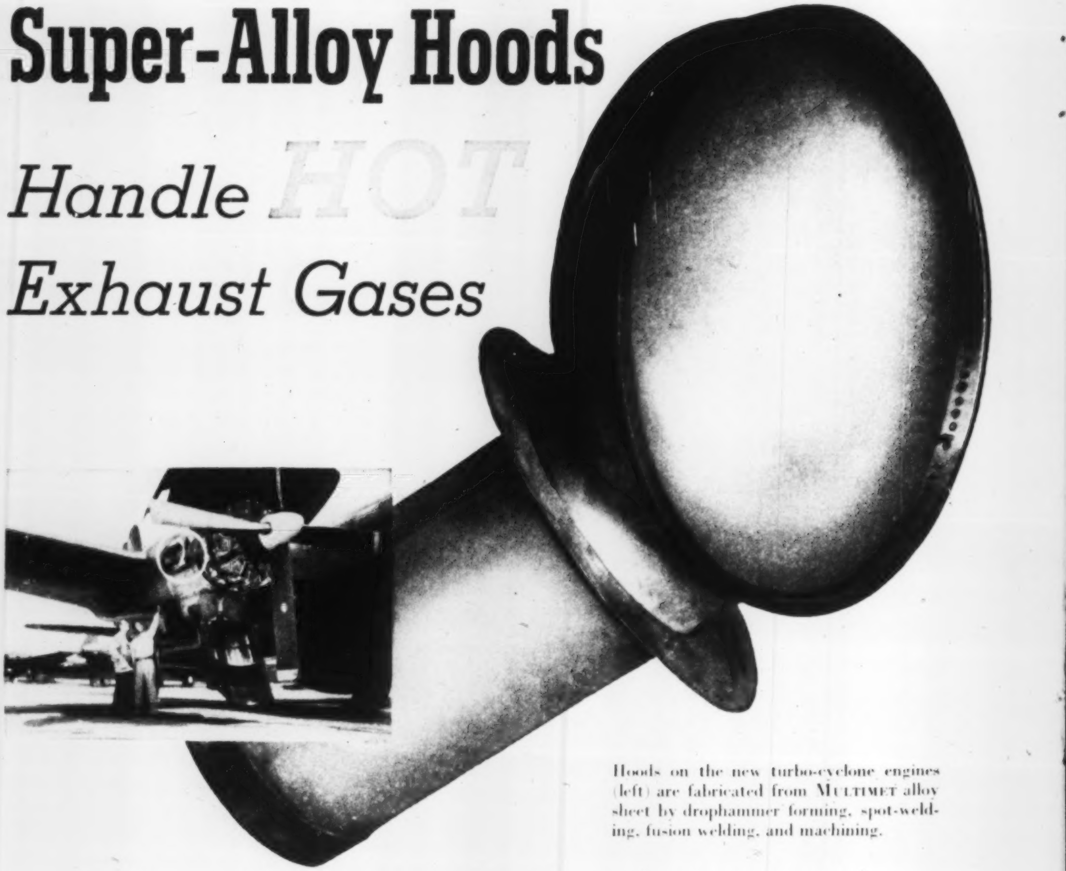

Hoods on the new turbo-cyclone engines (left) are fabricated from MULTIMET alloy sheet by drophammer forming, spot-welding, fusion welding, and machining.

Rugged hoods of MULTIMET alloy carry off exhaust gases from the turbo-cyclone engines on this latest version of the Navy's famous "Neptune." Each hood withstands the severe heat and stress from the exhaust of six of the 18 cylinders in the engines. The exhaust is compressed into a single stream, fed through a turbine, then passes off through the hoods.

One of the reasons why MULTIMET alloy was selected for this grueling service was because it had proved so successful in gas turbines. The alloy stands up under high stress at temperatures at which other metals buckle and crack.

Besides its many aircraft applications, MULTIMET alloy is also being used in heat-treating and cyaniding equipment and other key spots where heat and oxidation cause frequent failures of most metals. It is available in all standard cast and wrought forms and can be readily fabricated by most common methods. For complete information on properties and fabricating techniques, write for the booklet, "HAYNES Alloys for High-Temperature Service."

HAYNES *alloys*
TRADE-MARK

Haynes Stellite Company
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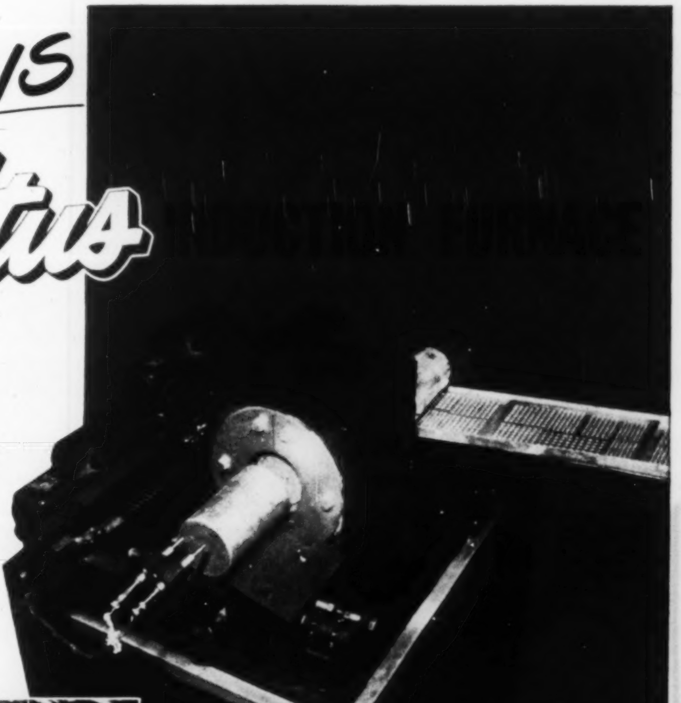
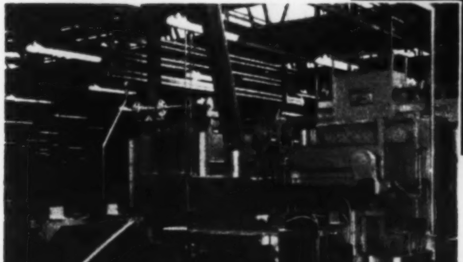
A Loftus INDUCTION FURNACE

to give YOU absolute uniformity with balanced electrical loading!





Fuel fired furnaces, famous for efficiency and dependability, have made Loftus a byword in heat treating shops throughout the nation.

The revolutionary "INTERTWIN" coil gives you greater production . . . more efficient operation . . . with absolute uniformity in heating, and BALANCED ELECTRICAL LOADING. Billet after billet is heated consistently and evenly . . . and with the deep, even penetration attained with the 60 cycle "INTERTWIN" electronic coil.

The whole operation is automatic . . . clean . . . efficient.

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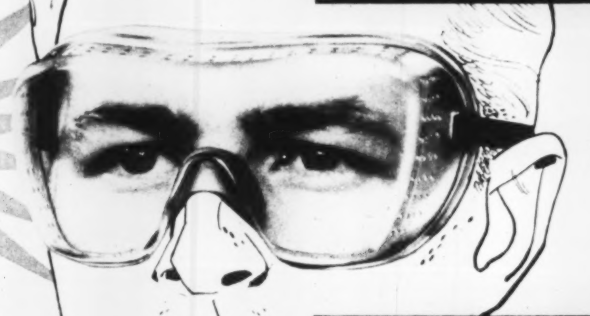
One ounce of protection

AO's NEW INEXPENSIVE ALL PLASTIC GOGGLE



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- WELL-VENTILATED
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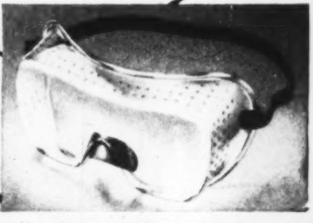
- WELL-FITTING



Note the many perforations which assure ample ventilation and minimize fogging. Face contacting edges are rolled for greater comfort on this goggle which offers a wide range of vision.

Goggle fits comfortably over most personal glasses with nosepiece hugging nose snugly.

Made of impact resisting plastic, this one-piece goggle (AO479 Clear, AO480 Green) is "optically correct" and meets government specifications. It affords exceptional wide angle vision and can be worn over most standard types of personal glasses and most prescription spectacles and goggles. Recommended for protection against foreign particles striking from any direction on the following types of work: babbiting, chipping, cutting rivets, grinding, hand-tool operations, machine operations, spike driving and similar operations. Your nearest AO Safety Products Representative can supply you.

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One size only but designed to fit all faces comfortably

Elastic headband, easily adjusted

4 point contact to face of wearer, resists rocking

Plastic nosepiece fits all noses comfortably and snugly

Rolled edges for comfort, better fit in contacting face

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forcing presses

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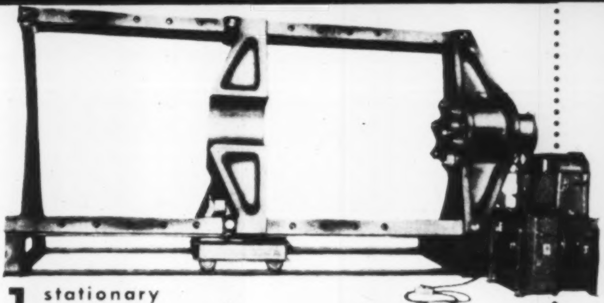
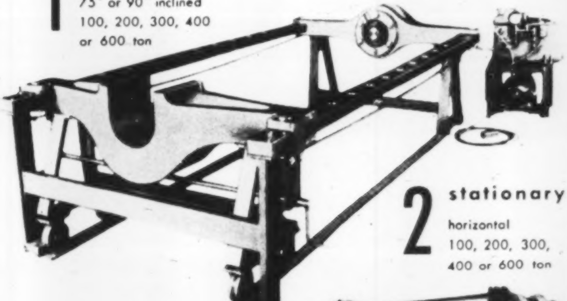


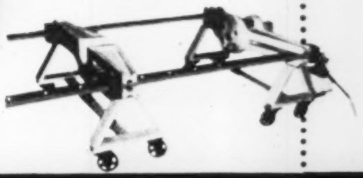
1 stationary

75° or 90° inclined
100, 200, 300, 400
or 600 ton



2 stationary

horizontal
100, 200, 300,
400 or 600 ton



3 portable

100 or 200 ton

NO MATTER which size and type best meets your requirements for pressing, bending, forming or straightening, you'll get a press with all the design and construction features that insure finest operation and long service.

Rodgers line of versatile forcing presses have separate pumping units—choose from hand-operated or power-driven pumps . . . The hydraulic cylinder is removable from head member for servicing or for other use . . . Tracks, tension bars, abutment member and head member are all separate units to facilitate handling and erection of press . . . Presses with power pumps can be controlled from any desired location.

Get complete information and you'll see why Rodgers Forcing Presses are best for your type service jobs.

Send for
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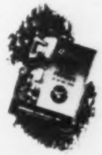

Rodgers Forcing Press Catalog No. 315A has 20 pages of descriptions and specifications on the complete line. Ask for your copy.

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YOU

can be proud

of your part in building a better America

Something wonderful has happened in our country during the past 10 years, and you have been a part of it.

It all started during the first dark days of World War II.

One of Uncle Sam's biggest problems was how to get a thousand and one things done *voluntarily* on the home front. Public-spirited business leaders offered their services *free*.

They formed the Advertising Council to tell the story. They called upon America's unmatched communications forces to help. Soon millions of messages were going out in magazines, newspapers, radio and posters, without cost to the taxpayer.

Wars take money. So the Council got behind the Treasury's War Bond Drives, and the nation responded as it always does to a just cause.

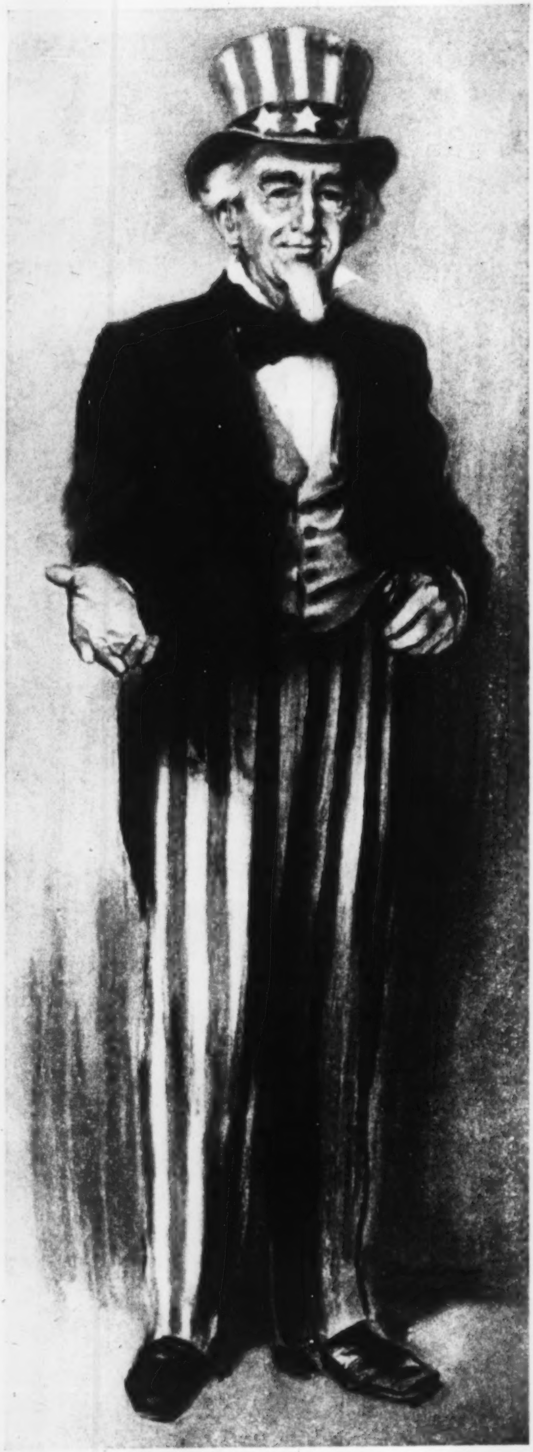
Wars chew up raw materials fast. So the Council helped Uncle Sam conduct salvage campaigns for metals, fats and paper. Again *you* met the need.

Then came campaigns on forest fire prevention, Victory Gardens, "loose talk," rationing, nurse recruitment and many others. And each time, when they learned the need, the people acted.

But this voluntary service did not end with the war. By popular demand, it began to help such peacetime causes as Savings Bonds, Highway Safety, Community Chests, Red Cross, Economic Education, Crusade for Freedom, Better Schools, Civil Defense and Blood Donation.

Over a billion and a half dollars in advertising space and time have been given freely by American business to do these vital jobs in the public interest. Hardly an American but knows about them and has had some part in their progress.

This publication salutes the Advertising Council on its Tenth Anniversary as a wonderful example of American teamwork. Its achievements are a tribute to the whole American people to business that supports its activities to all those devoted workers, in so many fields, who have helped to tell you what needed doing. But most of all to *you* who *did* it!



Reminded by ads like this, contributed by the magazines of America at no cost to Uncle Sam or the taxpayer, you now own over $35 billion in Defense Bonds.

What YOU Can Do . . . MUST Do
To Ease the Critical Iron and Steel Scrap Problem

When scrap is needed quickly to keep our defense plants rolling, ads like this, sponsored by leading business and trade publications, help to make that need known.

What the Advertising Council Is

. . . *and what it does*

As it starts on its second decade, the Advertising Council is a fine example of the conscience of America in action. It is a voluntary organization—independent, non-profit, non-partisan—dedicated to the welfare and progress of all our people.

It is composed largely of advertisers, agencies and media, including magazines, newspapers, radio and television, the outdoor and transportation advertising groups.

The Council's budget is contributed by business generally. Space and time for Council programs are donated by advertisers and media. Advertising agencies provide free all the creative talent needed for the preparation of campaign materials.

As the first organized, systematic method of getting important messages to the public quickly, the Council annually reviews hundreds of requests for help from government agencies and leading non-profit organizations which have learned that advertising—through simplification, dramatization and repetition—gets things done.

Closely associated with the Council is an Industries Advisory Committee consisting of 38 business leaders and a Public Policy Committee which evaluates requests for campaigns. The latter includes 20 leading representatives from the fields of management, labor, education, agriculture, religion, medicine and journalism.

All these good Americans have accomplished much by working together. But so much *more* still remains to be done! This publication is confident that the Advertising Council will continue to do its part by giving you the facts about national problems as they arise, so that in the future as in the past, they will be met in the traditional voluntary American way.

The messages you see and hear over radio and television on behalf of national causes such as Better Schools, Blood Donors, CARE, Fight Inflation and Racial and Religious Prejudice, are scheduled by the Council. Stars, advertisers, agencies, networks and local stations all cooperate.

Take your time - not your life!

The posters along the thoroughfares and in your transportation vehicles often carry messages in the public interest. The space is given by the Outdoor and Transportation advertising industries.

The Council also serves American Cancer Society, American Heritage, Boy Scouts, Brotherhood Week, Christmas Seals, 4-H Clubs, Flag Day, Girl Scouts, Heart Fund, Religion in American Life, Salvation Army, United Negro Colleges, and many other projects in the public interest.

The woman of the year
CAN BE
Enroll now in a School of Nursing

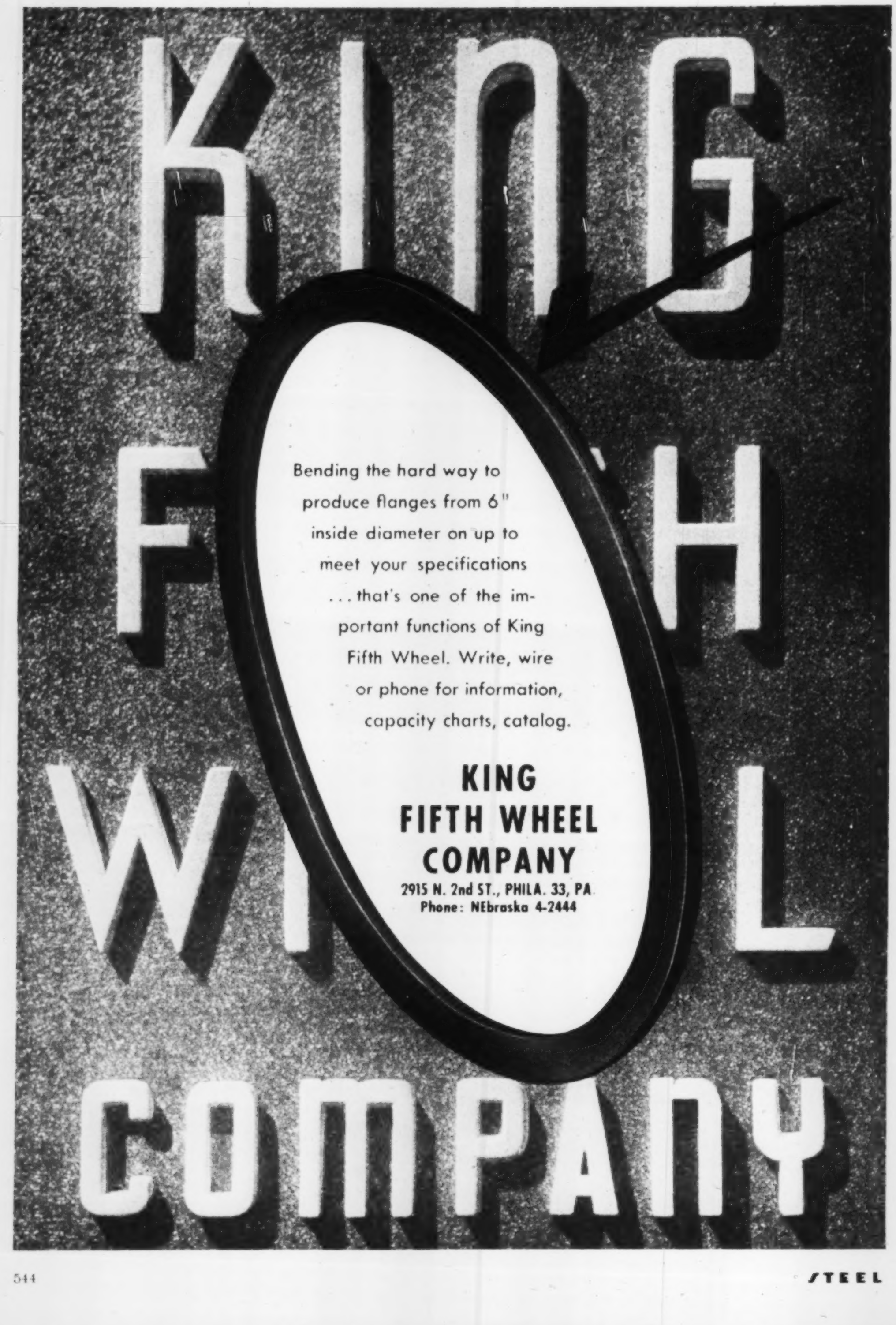
You learned of the nurse shortage from ads like this, many of them contributed by daily, weekly and labor newspapers. During the past five years, 418,000 young women have responded.

IVAN is watching you

We must increase American productivity if we are to meet our defense needs and maintain a strong civilian economy. House magazines of leading companies carry ads like this regularly.

A PUBLIC SERVICE PROJECT
THE ADVERTISING COUNCIL

This advertisement is contributed by
STEEL
magazine as a public service.

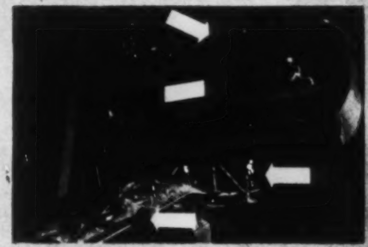


Bending the hard way to produce flanges from 6" inside diameter on up to meet your specifications . . . that's one of the important functions of King Fifth Wheel. Write, wire or phone for information, capacity charts, catalog.

**KING
FIFTH WHEEL
COMPANY**

**2915 N. 2nd ST., PHILA. 33, PA
Phone: NEbraska 4-2444**

Dings non electric pulley-type scrap separator in operation at a die cast plant.



Dings Extra-Powerful Self-Cleaning Rectangular takes iron out of shakeout sand.

Dings Cool Operating Lifting Magnet.

Dings "Hold Tite" magnetically holds castings in position for swing grinding.

1 2
3 4

4 MEANS TO GREATER EFFICIENCY

THE four Dings Magnets illustrated save time, labor, metals and money by doing their specific jobs more efficiently than any other method. Compare the advantages they offer over your present methods:

1 **FOR CRITICAL SCRAP SEPARATION** — Example: *A Non Electric, Permanently Magnetic Pulley Type Separator.* The magnetic PERMA-PULLEY, installed as head drive pulley in a completely self contained belt conveyor unit, takes iron out automatically, without attention, without electricity, without maintenance. Portable models available. Other types to meet any scrap separation requirement.

2 **A SAND HANDLING COST CUTTER** — *the Suspended Self Cleaning Rectangular.* Great power enables magnet to handle the particularly difficult iron extraction jobs. Self cleaning feature makes operation automatic, eliminates "carry-over" of sand with iron.

3 **THE IDEAL SCRAP LIFTING MAGNET** — Lifts more because it's cooler operating. Light weight, moisture-proof, rugged, 4-point chain suspension.

4 **"HOLD TITE" MAGNET CUTS GRINDING LABOR COSTS UP TO 25%** — Firmly holds all shapes of castings up to 1000 lbs. in position for swing grinding. Can be tilted to 7 different positions. Simple to install.

For details on any of the above magnets, use the coupon below.

Dings

MAGNETIC SEPARATOR CO.
4709 West Electric Avenue, Milwaukee 46, Wisconsin

SEND THIS COUPON
OR DROP A POSTCARD

Dings: Send me Catalog containing full information on:

☐ Scrap Separators
☐ Rectangular
☐ Lifting Magnet
☐ "Hold Tite"

NAME________________________________

COMPANY________________________________

ADDRESS________________________________

S

To the SALES-MINDED

Plan on using
ALUMINUM!

Now is the time to be planning designs and materials for products of tomorrow

Progressive manufacturers, designers and engineers are *now* planning and preparing for *tomorrow*. And those who are *really* future-thinking have a mental memo tacked up in the corner of the drawing board . . . it reads "Plan on using aluminum."

Those who have used aluminum in experimental and present day models know it provides lighter, tougher, longer-lasting construction.

Also, there is the assurance that future supplies will be plentiful. Deposits of bauxite ore are ample for generations. Production facilities are rapidly expanding. You *know* you can depend on *tomorrow's main metal* at a consistently low cost.

Reynolds Aluminum Specialists, now working with many companies on their future designs, will be glad to work with you to assure the maximum benefits of aluminum. Write to Reynolds Metals Company, 2520 South Third St., Louisville 1, Kentucky.

BE SURE TO see The Kate Smith Evening Hour every Wednesday, NBC-TV, hear The Big Show with Tallulah Bankhead every Sunday, NBC Radio Network . . . consult newspaper for local time and station.

Engineer planning for Tomorrow...

You can't afford to overlook the advantages of planning with aluminum . . . its light weight with great strength (pound for pound, you get *three times more* aluminum than iron, steel or copper, etc.). Aluminum is consistently low in price in the face of rising costs of other metals (aluminum costs *less* now than before World War II—the only metal of which this is true). It is *naturally* resistant to rust and corrosion, easily fabricated by simple, modern methods. Utilize its naturally attractive appearance or treat it with a wide range of mechanical, chemical or electrolytic finishes.

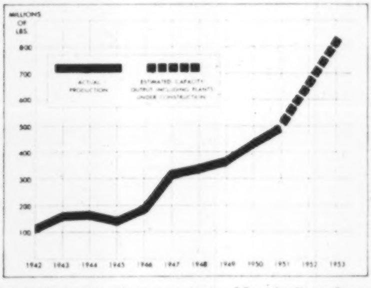
Write for the Reynolds Technical Handbooks on aluminum design and fabrication listed below. Please send your request on business letterhead, otherwise the price of each book is one dollar.

REYNOLDS TECHNICAL LIBRARY OF BOOKS AND FILMS

- A-B-C's of Aluminum *(from mine to finished products)*
- Aluminum Data Book *(Aluminum Alloys and Mill Products)*
- Aluminum Structural Design
- Designing with Aluminum Extrusions
- Fastening Methods for Aluminum
- Finishes for Aluminum
- Forming Aluminum *(available about Feb. 1)*
- Welding Aluminum
- Machining Aluminum Alloys
- Heat Treating Aluminum Alloys
- Metals Weight Slide Rule

And to instruct large groups of personnel . . . to put more interest in your training program . . . get these 16mm, color-sound films from Reynolds Film Service.

- SHAPE OF THINGS TO COME. Interesting description of the aluminum extrusion process and the design opportunities it provides. Running time 30 minutes.
- TALE OF THE POWDERED PIG. Developments in aluminum powders and pastes including their application in protective and decorative coatings. Running time 22 minutes.
- PIGS AND PROGRESS. The complete story of aluminum from mine to finished products. Covers all forms of aluminum. Running time 22 minutes.



The expanding primary aluminum production of Reynolds Metals Company . . . a historic chapter in the company's 33 years of continuing growth

And to the man in charge of TODAY'S PRODUCTION

Do you have a defense contract that specifies aluminum? To eliminate production problems, acquaint yourself with the accepted production techniques for fabricating aluminum. Write on your business letterhead for the aluminum fabrication books listed above. And for special problems, take advantage of Reynolds trained staff of aluminum specialists. Reynolds Metals Company, 2520 South Third Street, Louisville 1, Kentucky.

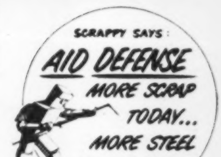
REYNOLDS ALUMINUM

REYNOLDS METALS

MODERN DESIGN HAS ALUMINUM IN MIND

Indignant about the steel shortage?

Let us try to help you! In the supplies of steel that are available, we can often find a type of steel that will answer your particular purpose. Call one of our salesmen the next time you are faced with a steel supply problem. Our experience and resources may furnish your solution.



UNITED STATES STEEL
COMPANY

UNITED STATES STEEL SUPPLY DIVISION

HEADQUARTERS: 208 SO. LA SALLE ST., CHICAGO 4, ILL.

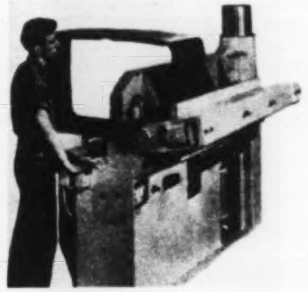
Warehouses and Sales Offices: BALTIMORE · BOSTON · CHICAGO · CLEVELAND · LOS ANGELES · MILWAUKEE · MOLINE, ILL.
NEWARK · PITTSBURGH · PORTLAND, ORE. · SAN FRANCISCO · SEATTLE · ST. LOUIS · TWIN CITY (ST. PAUL)
Sales Offices: INDIANAPOLIS · KANSAS CITY, MO · PHILADELPHIA · PHOENIX · ROCKFORD, ILL. · SALT LAKE CITY · TOLEDO · TULSA · YOUNGSTOWN

New Products and Equipment

Bender Forms in Single Cycle

USE REPLY CARD—CIRCLE No. 1

Single-wing tangent bender, made by Cyril Bath Co., 6972 Machinery Ave., Cleveland 3, O., shapes flanged sheets around fixed, radiused corners without wrinkling. Called model F, it facilitates rapid, accurate forming of metal cabinets, cases, housings, liners and shrouds with two or more radiused corners. Open throat design permits fully-formed shapes to be removed easily and quickly. Ram latches with bed in the last inch of travel, exerting a maximum 17 tons vertical pressure.



. . . shapes fixed corners without wrinkling

Bender features automatic positioning of metal to be formed to gain volume production and cut hand finishing. Model is available in three types, with die space of 48, 36 or 24 inches. It can be made for air or hydraulic operation and controlled for automatic cycling or used with separate ram and wing controls for manual operation. Air operated machine uses standard 70 psi line pressure and requires 2 cu ft of air per cycle. Under automatic sequence control, cycle is completed in 4½ seconds; under manual control, cycle takes 7½ seconds.

Fork Lift Series Introduced

USE REPLY CARD—CIRCLE No. 2

Buda Co., Harvey, Ill., introduces its FT series fork lift trucks, powered by either diesel or gasoline engines. Trucks are available in 12 models, on solid or cushion tires, in capacities of 3000, 4000, 5000, 6000 and 7500 pounds at 24-inch load centers and 4000 pounds at 18-inch load centers. Functional design permits more than 85 per cent of replaceable parts to be interchanged on all 12 models.

Models have roller construction masts with rolled mast channels; two speeds forward and reverse gear shift; quick change heavy duty clutch; and carriage mounted on adjustable side thrust rollers to reduce wear. Complete complement of electrical gages on full front vision instrument panel is included. All parts are completely accessible for replacement and maintenance. Trucks are available in five standard masts, having 72, 84, 108, 114 or 120-inch lift.

. . . replaceable parts are interchangeable

Optical Dividing Head

USE REPLY CARD—CIRCLE No. 3

F. T. Griswold Mfg. Co., 305 W. Lancaster Ave., Wayne, Pa., offers an optical dividing head with fixed base, developed for inspection and production applications. Head checks angular dimensions such as spacing of spur gear and ratchet teeth, measuring eccentricity and contours of cams and other shapes, accuracy of milling cutters, broaches, splined shafts, etc. Another application indicated is on machine tools where precise positioning is necessary in either horizontal or vertical plane.

Measurements are made optically by alignment of visible scales. Measurements made on periphery of a 12-inch diameter circle can be held and repeated to within 0.0005-inch chordal distance. Optical system has a circular dial marked in 30 second divisions and an illuminated glass scale on which degree marks from 0 to 360 are etched.

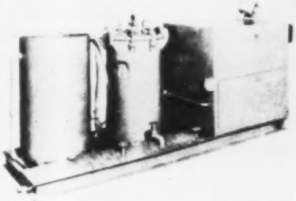
REPLY CARDS

on page 553 will bring you more information on any new products and equipment in this section.

Machine Impregnates Castings

USE REPLY CARD—CIRCLE No. 4

Machine for production line impregnating of castings to eliminate porosity, is announced by Metallizing Co. of America, 3520 W. Carrol Ave., Chicago 34, Ill. Called model M-3 Mogullizer, it seals both leaking and weeping castings, ferrous and nonferrous metals, under a high vacuum. Unit has 4½ cu ft capacity. Vacuum pump, sealing, rinsing and supply tanks, heating elements and power supply, and all fittings and controls are included in the complete unit. Sealing or vacuum tank is 20 x 30 inches and entire machine requires 36 x 100 inches of floor space.



. . . vacuum-seals leaking or weeping pieces

Precision Production Gage

USE REPLY CARD—CIRCLE No. 5

Electronic microcomparator, an instrument reading directly in millionths of an inch, is introduced by Graham-Mintel Instrument Co., 735 Carnegie Ave., Cleveland 15, O. Designed specifically for gage room use in ultra-precision production gaging, the unit has an induction gage head, adjustably mounted on a rigid stand, and high-stability four-tube amplifier with two-scale meter. Gage head has frictionless movement with no mechanical amplification. Meter's two continuous linear scales read 0.000001 and 0.000010-inch per division either side of zero. Scales can be used interchangeably.

Gage head is positioned by rack and pinion vertical adjustment accommodating work of any height to 12½ inches above top of standard anvils. Fine adjustment is provided by knob on the gage head that moves 0.0035-inch per turn. Pushbutton on the base front works through a cable to raise contact tip about 0.003-inch, to facilitate placing work in measuring position.

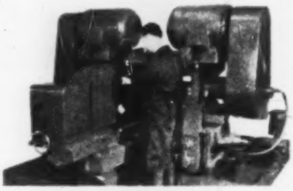
. . . reads directly in millionths of inch

Machine Grinds Clutch Plates

USE REPLY CARD—CIRCLE No. 6

Double spindle grinder for grinding parallel sides of steel or bronze-faced clutch plates is introduced by Gardner Machine Co., Beloit, Wis. Grinder handles plates from 12½ to 19 inches OD and about 0.126-inch thick. Heavy cast iron base supports grinding head slides on dove-tailed ball bearing ways. Each head has 4-inch spindle; is provided with tilting feature that permits setting 26-inch diameter abrasive disks at proper angles for best grinding results.

Hydraulically operated sliding work table on which special fixture is carried, is mounted on the front. Three variable speed, grooved rollers, riding on the inside diameter of the clutch plate, rotate it during grinding. Two rollers are power driven, the third is movable so it can be released to permit easy loading and unloading. Production averages 35 to 40 pieces per hour, removing 0.010-inch overall stock. Tolerances of 0.001 to 0.0002-inch for parallelism and 0.005 for uniformity are maintained.

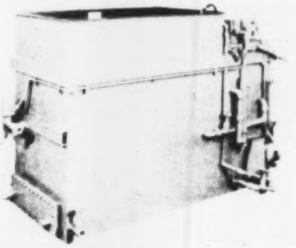


. . . handles pieces 12½ to 19 inches OD

Solvent-Vapor Degreaser

USE REPLY CARD—CIRCLE No. 7

Redesigned and improved model VS-800 hand operated solvent-vapor degreaser, using nonflammable chlorinated hydrocarbon solvents, is offered by Detrex Corp., Detroit 32, Mich. Machines in the series have lowered working height and an efficient solvent condenser. Inside work space is cleared of all projections, including solvent collecting trough, condensing coils and vapor level control bulb by integrating storage tank with main machine body. This provides unobstructed entrance for work being cleaned. Relocation of solvent storage space also permits operation from either side of the machine.



. . . uses nonflammable hydrocarbon solvent

Further refinements include a simplified piping and water separator arrangement, large access door for easy cleaning of solvent storage section and redesigned condenser coils that provide greater volume of distillant for slushing. Improved corrosion-resistant coating, called FF-1, is applied to all interior surfaces. Model's standard series includes 21 sizes.

Trailer Added to Handling Line

USE REPLY CARD—CIRCLE No. 8

Dump trailer having ½-cu yd capacity is added to the line of materials handling equipment made by Phillips Mine & Mill Supply Co., 2309 Jane St., Pittsburgh 3, Pa. Self-dumping unit is designed for three-way use: Manual, fork lift or industrial tractor. Tongue is made sufficiently sturdy for towing singly or in train by tractor. Two pockets accommodate lift forks. Trailer is built of heavy gage steel, all-welded. Wheels have roller bearings, solid rubber tires and are castered for greater maneuverability. Hopper's balance causes load to be emptied when safety catch is released, then automatically returns carrier to loading position and re-engages safety catch. Model is designated T-SRF-½ by the manufacturer.

. . . moved by hand, fork lift or tractor

Pump Adds Plating Agents

USE REPLY CARD—CIRCLE No. 9

Addition agent pump that provides small but constant rate of flow to any reasonably large plating tank is available from R. O. Hull & Co. Inc., 1306 Parsons Court, Rocky River 16, O. Pump eliminates manual element to provide a constant flow rate, creating maximum uniformity of plating and economical use of addition agents. Unit is self-priming.

One pump operates one to four individual lines from supply tanks

BEST WAY TO STRIP BIG INGOTS AT LESS COST

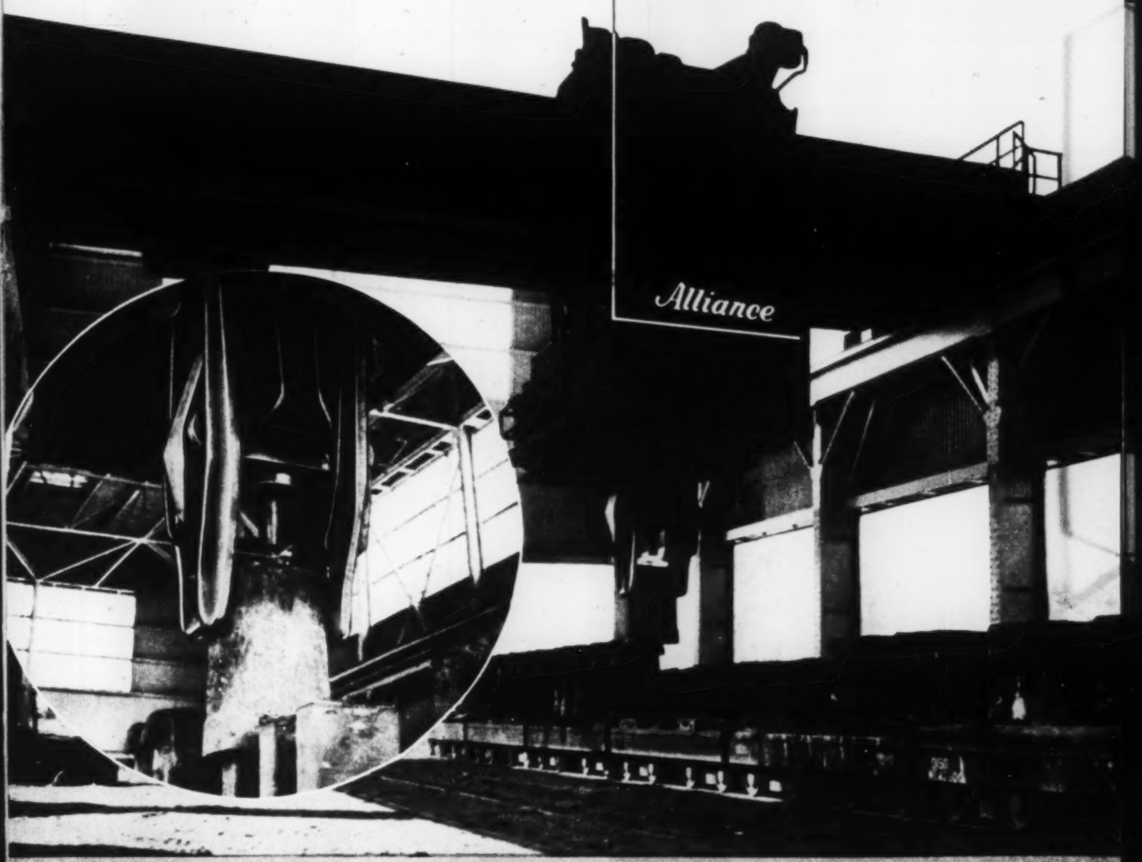
● The 200-ton push-pull, screw-type Alliance Stripper Crane, pictured below, is helping the Fontana Works of Kaiser Steel Corporation produce better ingots at less cost.

The stripper is equipped both with a retractable bullnose and gripping tongs so that the operator, unassisted, can make all necessary adjustments to strip either large end-up or small end-up ingots. The compact cab provides the operator with maximum visibility and safety, while the smooth-working mechanisms respond instantly to the slightest direction of simplified finger-tip controls.

Alliance . . . world's largest builder of the world's largest cranes . . . builds strippers having a name-plate rating of 400 tons and an overload rating of 1200 tons. This combination results in fewer stickers and consequent saving in costly alloy ingots as well as moulds. These strippers are equipped with the electric counterweight developed by The Alliance Machine Company which prevents the ingots from falling when stripped, thereby preventing damage to the ingot stools, axles, anti-friction bearings of the ingot buggies . . . reducing maintenance to a minimum.

Alliance Cranes like this can provide you with more than enough strength and versatility to meet steadily increasing production demands.

Let us help you plan for more economical lifting power in your plant with these big, dependable cranes. Write today for an analysis of your particular requirements.



THE ALLIANCE MACHINE COMPANY

MAIN OFFICE
ALLIANCE, OHIO • PITTSBURGH OFFICE
1622 OLIVER BUILDING, PITTSBURGH, PA.

LADLE CRANES • GANTRY CRANES • FORGING MANIPULATORS • SOAKING PIT CRANES • STRIPPER CRANES • SLAB AND BILLET CHARGING MACHINES • OPEN HEARTH CHARGING MACHINES • SPECIAL MILL MACHINERY • STRUCTURAL FABRICATION

to plating tanks. Liquids that do not affect rubber, neoprene or tygon tubing can be pumped at any desired rate of flow from 12 ounces to 27 gallons per hour. Liquid touches nothing but the tubing.

Rust Preventive Paint

USE REPLY CARD—CIRCLE No. 10

Rust inhibitor No. 425, introduced by United Laboratories Inc., Cleveland, O., dries in 10 minutes under normal drying conditions and one coat provides excellent hiding of the old metal surface. It will withstand temperature from minus 100° F to plus 250° F and is resistant to salt air and fumes. It may be applied over damp surfaces, interior or exterior, galvanized metal and new or rusted metal surfaces.

Tapping Head

USE REPLY CARD—CIRCLE No. 11

A tapping head designed for tapping 0-80 to 4-40 holes in steel or other material at high speed and with sensitive feel of the tapping operation is offered by Winslow Product Engineering Corp., Los Angeles 22, Calif. Tapping head is mounted to the spindle of a standard drill press. Provision for vertical travel of the tap is built into tapping head itself.

Lubricator for Tube Cleaners

USE REPLY CARD—CIRCLE No. 12

A sight-feed lubricator that assures adequate lubrication of tube cleaners and other air or steam powered tools is announced by Elliott Co., Jeannette, Pa. Once set, it requires no adjustment. It is actuated entirely by pressure of the operating air or steam, not by flow.

High Pressure Springs

USE REPLY CARD—CIRCLE No. 13

High pressure springs for all die applications and general machinery use are available from Producto Machine Co., Bridgeport,

USE A
REPLY CARD
Just circle the corresponding number of any item in this section for more information.

Mary Lou thinks Santa's very wise

She's no expert on industrial production, but Mary Lou completely approves the way Santa does things. Her new roller skates are light in weight, smooth and strong. Her doll buggy and her toy stove and—oh, lots of the things she found under the Christmas tree—have those same desirable characteristics.

Mary Lou hasn't heard of metal forming presses, but already she's learned to prefer the things they make. And because press production holds costs down, Santa was able to provide *more* things to delight her little girl heart.

As a manufacturer, you can't afford to overlook this significant public preference which manifests itself at such an early age. Production by press methods means easier sales and more of them—of anything made of metal. As you plan your new lines, we urge that you talk to a Clearing man, and find out just what Clearing presses can do for your business.

CLEARING PRESSES

THE WAY TO EFFICIENT MASS PRODUCTION

CLEARING MACHINE CORPORATION
6499 WEST 65th STREET • CHICAGO 38, ILL.

Helpful Literature

74. Vertical Propeller Pumps

Worthington Pump & Machinery Corp.—Line drawings, graphs and tabulated dimensions descriptive of KJA vertical propeller pumps used in flood control, drainage, irrigation and similar low head services are presented in bulletin W-314-B2.

75. Aluminum Bronze Alloys

Ampco Metal, Inc.—Cost-saving information about uses of Ampco metal and Ampcoloy alloys, a series of aluminum bronze alloys of high aluminum and iron type, in gears, bearings, cams, dies, and wear strips is given in 4-page bulletin G-1. Corrosion resistant applications, plus physical properties and photomicrographs of alloy are included.

76. Electric Motors

Wagner Electric Corp.—General information on type RA repulsion-start, single-phase induction motor, as well as on dry-type transformers for power distribution is given in 4-page folder MU-94, No. 16. Motor has high torque and low starting current.

77. Hydraulic Drill Units

Rockwell Mfg. Co., Delta Power Tool Div. — Designed for drilling, reaming, tapping, chamfering, spot facing and centering, Delta 19-150 and 19-400 hydraulic drills are basic units adaptable to special machines for high production work. 12-page catalog AD664 illustrates units in actual operation along with drawings of internal construction.

78. Oil Mist Precipitator

Trion, Inc.—4-page illustrated catalog E-50 is descriptive of oil mist precipitators designed for eliminating hazardous coolant oil mist and smoke emanating from high speed cutting, grinding and machining operations. Special features plus line drawings of suggested mounting methods are included.

79. Heat Treating

Surface Combustion Corp.—Included in 8-page "Heat Treat Review" are articles "Continuous Production with 'Surface' Batch Furnaces," "Protective Atmospheres for Annealing Nonferrous Wire" and other informative material concerning heat treating. Technical article briefs and titles of available literature are included.

80. Machine Tool Duplicator

Turchan Follower Machine Co.—The Turchan Follower, a hydraulic duplicating attachment which performs mass production or job lot duplicating automatically in metal from master pattern or templates, is subject of 12-page illustrated brochure. Duplicator can be attached to any standard milling machine, boring mill, lathe, shaper, planer or grinder.

81. Tinning Compound

All-State Welding Alloys Co.—Miniature 4-page folder describes a quick easy way to tin surfaces, rustproof metals and regalvanize damaged spots with Kromover touch-up pencil.

82. Abrasive Cutting

Allison Co.—"Abrasive Cutting" is title of 16-page illustrated manual on the use of abrasive cut-off wheels with wet, submerged and dry cutting techniques. Recommendations are tabulated for wheel selection in cutting wide range of materials including metals, ceramics, glass, plastics and masonry. Various types of abrasive cutting machines are explained, and typical machines are shown.

83. Thermocouples

Arklay S. Richards Co.—16-page illustrated catalog No. 5 contains descriptive data, application information, specifications and general information on thermocouples, protection tubes, thermocouple wire, lead wires and insulators for all makes of pyrometers.

84. Electronic Air Filter

American Air Filter Co.—16-page illustrated bulletin No. 250-F contains complete design, performance and application information on model E-2 Electro-Matic automatic electronic precipitator. Offered in wide range of sizes, these air cleaning units can be arranged in multiples to suit practically any need.

85. Hard-Facing Rod

Victor Equipment Co.—Suggested electrical applications for Tungsmooth coated hardfacing rod containing 60 per cent fine mesh (40-dn) tungsten carbide are listed in 4-page form 323. Rod is available in ⅜ x 14-in. and 3/16 x 14-in. sizes.

86. Collet Chucks

Sutton Tool Co.—Levermatic collet chucks, available in 1, 1½ and 2-inch capacities, and Handmatic collet chucks, offered in same sizes, are described and illustrated in 8-page catalog "Get a Better Grip on Production." Accessories and standard and special chuck applications are presented, along with specifications.

FOR MORE INFORMATION USE ONE OF THESE CARDS . .

FIRST CLASS
PERMIT No. [illegible]
(Sec. 34.9 P.L.&R.)
Cleveland, Ohio

BUSINESS REPLY CARD
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Penton Building
CLEVELAND 13, OHIO

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8	28	48	68	88
9	29	49	69	89
10	30	50	70	90
11	31	51	71	91
12	32	52	72	92
13	33	53	73	93
14	34	54	74	94
15	35	55	75	95
16	36	56	76	96
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20	40	60	80	100

STEEL 1-7-52
Penton Building, Cleveland 13, Ohio

Please send ☐ Literature ☐ Price Information ☐ Nearest source of supply on the items circled at the left.

NAME TITLE

COMPANY

PRODUCTS MANUFACTURED

ADDRESS

CITY and ZONE STATE

This card MUST be completely filled in. Please TYPE or PRINT

87. Testing Machine

Baldwin-Lima-Hamilton Corp.—Details of new Baldwin Sonntag model 12-H universal testing machine are presented in 4-page illustrated bulletin 336. This 12,000-lb capacity machine consists of separate loading and control units so that it can be adapted to various space requirements.

88. Clad Brazing Metals

American Silver Co.—How Braze-Clad metals are used to produce good silver-brazed joints and simplified assemblies is subject of 4-page illustrated bulletin BC-51. Metals are offered in variety of bases and with silver brazing alloy surface on one or both sides of any specified thickness or melting range.

89. Packaged Pumps

Allis-Chalmers Mfg. Co.—Engineered for wide range of fractional horsepower applications in capacities to 80 gpm at heads to 100 ft, package pumps are subject of 6-page illustrated folder 52B7529. Open and closed impeller close-coupled, pedestal mounted and open impeller vertical mounting types are available.

90. Shielded Arc Welding

Air Reduction Co.—16-page illustrated catalog 9 is descriptive of Heliwelding inert gas shielded arc welding. Hard-to-weld metals are joined easily with this process. Details of manual and machine holders, automatic head, control equipment and welding machines are included. Freedom from oxidation and pin-point heat concentration are advantageous characteristics of Heliwelding.

91. Speed Indicator

Herman H. Sticht Co.—Accurate to ½-per cent, improved Jaquet speed indicators described in illustrated 4-page bulletin No. 735 have ball bearing spindle and dial with extra scale divisions for increased readability. Chronometric type tachometers shown cover speeds from 0.02-rpm per division to 100,000 rpm.

92. Gear Deburring Equipment

Sheffield Corp.—Gear Deburizer, a machine which deburrs and chamfers spur, helical, multiple start worm, hypoid and bevel external gears, is subject of 8-page illustrated catalog B380-51. It automatically machines up to 300 teeth per minute.

93. Lathe Centers, Accessories

Ready Tool Co.—Illustrated pocket-size folder catalogs line of Red-E antifriction centers, carbide-tipped centers, high speed centers, tool holders, grinding and milling dogs and accessories.

94. Universal Arch Nosings

Geo. P. Reintjes Co.—Standardized arch nosing using minimum number of refractory shapes is subject of No. 751 illustrated folder. Castings are universally adaptable, have maximum of space for air cooling and require minimum head room. Applications to melting and heating furnaces are shown.

95. Hand Trucks

Rapids-Standard Co. — Descriptions and prices of Wheel-Ezy hand trucks for handling cases, boxes, cartons, bags and kegs are included in 2-page form WEL-51. Four wheel types shown permit moving loads weighing up to 500 lb.

96. Abrasive Disks & Cylinders

Simonds Abrasive Co.—Uses and applications of nut-inserted and bolt-inserted abrasive disks and cylinders for horizontal or vertical spindle disk and surface grinding operations are detailed in 4-page illustrated bulletin ESA-54. Grain and grade recommendations for common disk grinding operations are included.

97. Unit Heaters & Convectors

Airtherm Mfg. Co. — Steam unit heaters of propeller and blower fan types, free-standing and partially recessed convectors, and oil and gas fired unit heaters are covered in 4-page illustrated bulletin 29g/Al.

98. Stamping & Forming Press

Ace Tool & Die Works—Small cutting, perforating, stamping and similar operations can be performed on automatic Flexopress, described in 4-page illustrated folder No. 4-48. Speeds are infinitely variable from 150 to 600 rpm. Lengths up to 9 in. can be produced at rates from 9000 to 36,000 per hour.

99. Bundling Chain

American Chain & Cable Co., American Chain Div. — Automatic lock which is incorporated in Acco bundling chain assures safety in handling and eliminates need for pins and wire for binding and holding bundles. Details are given in 2-page illustrated data sheet DH-266.

100. Cupola Preheating

Whiting Corp. — "Hot Blast—for Better Melt, Closer Control, Greater Economy" is subject and title of 6-page illustrated folder FO-3 which describes both Griffin and Todd-Thermo processes for preheating cupola blast. Processes increase melting rate with high savings in coke, and gives closer metallurgical control.

FOR MORE INFORMATION USE ONE OF THESE CARDS . .

STEEL Numbers

1	21	41	61	81
2	22	42	62	82
3	23	43	63	83
4	24	44	64	84
5	25	45	65	85
6	26	46	66	86
7	27	47	67	87
8	28	48	68	88
9	29	49	69	89
0	30	50	70	90
1	31	51	71	91
2	32	52	72	92
3	33	53	73	93
4	34	54	74	94
5	35	55	75	95
6	36	56	76	96
7	37	57	77	97
8	38	58	78	98
19	39	59	79	99
20	40	60	80	100

STEEL 1-7-52
Penton Building, Cleveland 13, Ohio

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Water Alarm

USE REPLY CARD—CIRCLE No. 14

Hi-Lo water alarm, introduced by Northern Equipment Division, Continental Foundry & Machine Co., Erie, Pa., is designed primarily for high pressure service. It is dependable at all working steam pressures on both stationary and marine boilers. It uses no bellows, diaphragms, weights, floats, or differential pressure devices. It has no internal parts to wear or corrode.

Wire Rope Lubricant

USE REPLY CARD—CIRCLE No. 15

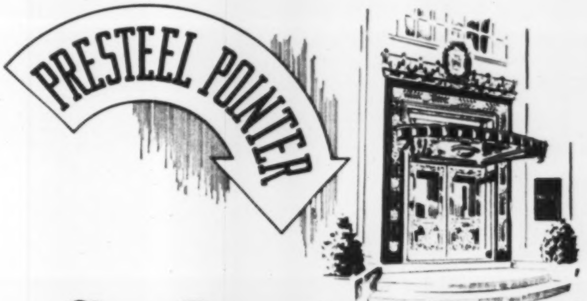
Designated as Crater A, a new wire rope lubricant is available from The Texas Co., New York, N. Y. Its penetration and adhesion properties will permit application to wet wire rope. It is a thin liquid product that is applied without heating. It remains pliable under a wide range of atmospheric conditions and will not drip or evaporate in hot weather or harden or chip in cold weather.

Heavy Duty DC Contactors

USE REPLY CARD—CIRCLE No. 16

Direct current contactors for steel mill and other heavy duty industrial applications are available from Westinghouse Electric Corp., Pittsburgh 30, Pa. Known as type M, they are accessible from the front. Their alignment is independent from accuracy of panel drilling, with only three mounting holes required. Contactors feature self-cleaning knife edge bearings that are not affected by dust.

USE A REPLY CARD
Just circle the corresponding number of any item in this section for more information.



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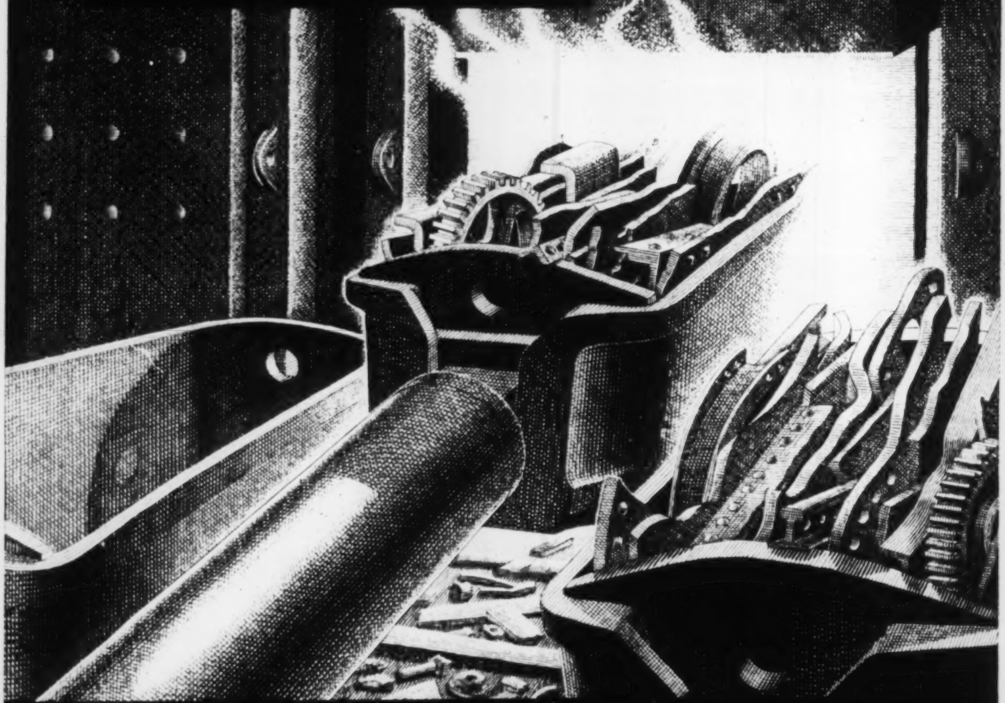

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LEADERS IN IRON AND STEEL SCRAP SINCE 1889

STEEL January 7, 1952

The Market Outlook

UNCERTAINTIES in the steel market outlook are intensified at turn of the year by the wage and price issue. Prompt solution of the problems raised is imperative in the interest of national defense and the general economy. But this all-important issue is only one of several in the industry giving cause for concern for the months ahead. Pressing for quick solution is the matter of metallics supply with low scrap inventories presenting a threat to capacity steelmaking. Then, also, distribution under government controls remains to be worked out more realistically.

PRODUCTION— For the first time in history, in 1951, United States mills produced more than 100 million tons of steel in a calendar year. Output is estimated at 105,145,000 net tons, ingot operations averaging 101 per cent. In 1950, output was 96,836,075 tons, operations hitting 97 per cent.

CAPACITY— U. S. steel production this year could hit a new peak, provided demand holds up and threatened operating difficulties are averted. Producing capacity beginning 1952 is estimated at 107 million ingot tons, up 3 million from Jan. 1, 1951. By yearend 1952 capacity is expected to exceed 117 million tons.

METALLICS— Shortage of metallics may prevent a new production record this year. Pig iron, alloying metals and scrap continue in short supply. Last year 71,304,000 tons of pig iron, including ferroalloys, were produced in this country, blast furnaces operating at 98.5 per cent. This compares with 65,439,769 tons and 91.4 per cent operations in 1950.

RAW MATERIALS— Last year purchased scrap requirements exceeded 36 million tons. It was nip-and-tuck through the year despite a government-sponsored collection drive. Considerable tonnage allocation to distress points was necessary to sustain capacity operations. This year purchased scrap needs are estimated in excess of 38 million tons. Iron ore consumption in 1951 exceeded 89,500,000 tons against 83,537,000 in 1950.

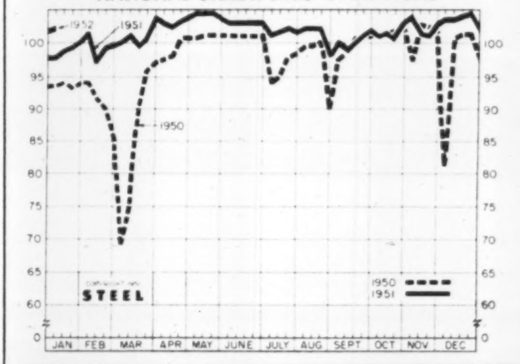
DEMAND— Heavy consumption of steel is indicated this year, though further curtailments in civilian goods tonnage allotments are scheduled in first and second quarters. Peak defense load still is months away. But with new steelmaking capacity scheduled for completion many trace authorities think supply-demand balance will be achieved sooner than generally anticipated. Some products are seen available in satisfactory volume by mid-1952, especially light, flat-rolled items. Alloy steel, carbon and cold-finished bars, oil country pipe and plates will be hard to get all year.

SHIPMENTS— Finished steel shipments last year totaled an estimated 79,174,000 net tons compared with 72,232,292 in 1950. Leading outlet was the warehouse industry which took 18 per cent of shipments. Auto industry ranked second, taking 16 per cent. Shifts in consumption reflected diversion of tonnage to defense account.

CONTROLS— Beginning mid-1951, steel distribution went under the Controlled Materials Plan. Civilian goods makers fought a losing battle for steel supply under this scheme. Cutbacks in automobile, appliance and other consumer durable lines were necessary, though some curtailments in these items stemmed from slower demand at wholesale level. Need for 100 per cent government control was questioned with military take limited. It was argued overall control added to confusion, intensifying shortages arising from inflated consumer demands, unrealistic allocation, and inept timing of shipments.

PRICES— Pressure for steel price increases had been rising even before the wage issue arose in the fall. Steelmakers have been insisting for months they needed relief to offset higher costs. Whether a formula can be worked out to permit price increases to compensate for a wage boost remains to be seen. Meanwhile, with exception of stainless and tool steel lists, and a few isolated products, steel price schedules are unchanged from those effected in December of 1950.

NATIONAL STEELWORKS OPERATIONS



DISTRICT INGOT RATES

Percentage of Capacity Engaged at Leading Production Points

	Week Ended Jan. 5†	Change	Same Week 1951	Same Week 1950
Pittsburgh	98.5	+ 1.5*	97.5	97
Chicago	103.5	— 0.5	99.5	97.5
Mid-Atlantic	101.5	0	100	86
Youngstown	106	0	106	102
Wheeling	102	+ 3.5	96	101.5
Cleveland	107	+ 4.5*	101	98.5
Buffalo	104	0	104	103.5
Birmingham	104	0	100	100
New England	89	0	83	80
Cincinnati	77	0	97	106
St. Louis	87	0	87.5	89
Detroit	106	+ 1.5	106	109
Western	102	0	92.5	83
Estimated national rate	102	0	98	93.5

Based on weekly steelmaking capacity of 1,999,034 tons for 1951-52, 1,928,721 tons for second half, 1950; 1,906,268 tons for first half, 1950; 1,843,516 tons for 1949.

*Change from revised rate for preceding week. † Preliminary.

Composite Market Averages

FINISHED STEEL INDEX, Weighted

	Jan. 3 1952	Week Ago	Month Ago	Year Ago	5 Yrs Ago
Index (1935-39 av. = 100)	171.92†	171.92	171.92	167.89	117.90
Index in cents per lb	4.657†	4.657	4.657	4.548	3.194

ARITHMETICAL PRICE COMPOSITES

	Jan. 3 1952	Week Ago	Month Ago	Year Ago	5 Yrs Ago
Finished Steel, NT	$106.32†	$106.32	$106.32	$103.50	$67.82
No. 2 Fdry. Pig Iron, GT	52.54	52.54	52.54	52.54	30.17
Basic Pig Iron, GT	52.16	52.16	52.16	52.16	29.56
Malleable Pig Iron, GT	53.27	53.27	53.27	53.27	30.79
Steelmaking Scrap, GT	43.00	43.00	43.00	45.50	31.17

Weighted finished steel index based on average shipments and Pittsburgh district prices of the following 14 representative products during 5-year base period 1935-39: Structural shapes, plates, rails, hot-rolled and cold-finished bars, pipe, wire, nails, tin plate, hot and cold-rolled sheets, galvanized sheets, hot and cold-rolled strip. For complete explanation see STEEL, Sept. 19, 1949, p. 54.

Arithmetical steel price composite based on same products as the weighted finished steel index with the exception of rails, cold-finished bars, galvanized sheets and hot-rolled strip.

Basic and No. 2 foundry pig iron composites are based on average prices at Pittsburgh, Bethlehem, Birmingham, Buffalo, Chicago, Cleveland, Granite City, Youngstown. Malleable composite based on same points except Birmingham.

Steelmaking scrap composite based on average prices of No. 1 heavy melting steel at Pittsburgh, Chicago and Philadelphia.

† Preliminary.

Comparison of Prices

Comparative prices by districts, in cents per pound except as otherwise noted. Delivered prices based on nearest production point.

FINISHED MATERIALS

	Jan. 3 1952	Week Ago	Month Ago	Year Ago	5 Yrs Ago
Bars, H.R., Pittsburgh	3.70	3.70	3.70	3.70	2.60
Bars, H.R., Chicago	3.70	3.70	3.70	3.70	2.60
Bars, H.R., del. Philadelphia	4.223	4.223	4.223	4.18	2.96
Bars, C.F., Pittsburgh	4.55	4.55	4.55	4.55	3.20
Shapes, Std., Pittsburgh	3.65	3.65	3.65	3.65	2.35
Shapes, Std., Chicago	3.65	3.65	3.65	3.65	2.35
Shapes, del. Philadelphia	3.918	3.918	3.918	3.90	2.48
Plates, Pittsburgh	3.70	3.70	3.70	3.70	2.50
Plates, Chicago	3.70	3.70	3.70	3.70	2.50
Plates, Coatesville, Pa.	4.15	4.15	4.15	4.15	2.50
Plates, Sparrows Point, Md.	3.70	3.70	3.70	3.70	2.50
Plates, Claymont, Del.	4.15	4.15	4.15	4.15	2.50
Sheets, H.R., Pittsburgh	3.60-75	3.60-75	3.60-75	3.60-75	2.50
Sheets, H.R., Chicago	3.60	3.60	3.60	3.60	2.50
Sheets, C.R., Pittsburgh	4.35	4.35	4.35	4.35	3.20
Sheets, C.R., Chicago	4.35	4.35	4.35	4.35	3.20
Sheets, C.R., Detroit	4.55	4.55	4.55	4.55	3.335
Sheets, Galv., Pittsburgh	4.80	4.80	4.80	4.80	3.55
Strip, H.R., Pittsburgh	3.75-4.00	3.75-4.00	3.75-4.00	3.75-4.00	2.50
Strip, H.R., Chicago	3.50	3.50	3.50	3.50	2.50
Strip, C.R., Pittsburgh	4.65-5.35	4.65-5.35	4.65-5.35	4.65-5.35	3.20
Strip, C.R., Chicago	4.90	4.90	4.90	4.50-4.90	3.30
Strip, C.R., Detroit	4.85-5.60	4.85-5.60	4.85-5.60	4.35-5.60	3.335
Wire, Basic, Pittsburgh	4.85-5.10	4.85-5.10	4.85-5.10	4.85-5.10	3.30
Nails, Wire, Pittsburgh	5.90-6.20	5.90-6.20	5.90-6.20	5.90-6.20	3.75
Tin plate, box, Pittsburgh	$8.70	$8.70	$8.70	$8.70	$5.75

SEMIFINISHED

	Jan. 3 1952	Week Ago	Month Ago	Year Ago	5 Yrs Ago
Billets, forging, Pitts. (NT)	$66.00	$66.00	$66.00	$66.00	$17.00
Wire rods, 7/32-3/8", Pitts.	4.10-30	4.10-30	4.10-30	4.10-30	2.55

PIG IRON, Gross Ton

	Jan. 3 1952	Week Ago	Month Ago	Year Ago	5 Yrs Ago
Bessemer, Pitts.	$53.00	$53.00	$53.00	$53.00	$31.00
Basic, Valley	52.00	52.00	52.00	52.00	30.00
Basic, del. Phila.	56.61	56.61	56.61	56.39	31.93
No. 2 Fdry, Pitts.	52.50	52.50	52.50	52.50	30.50
No. 2 Fdry, Chicago	52.50	52.50	52.50	52.50	30.50
No. 2 Fdry, Valley	52.50	52.50	52.50	52.50	30.50
No. 2 Fdry, Del. Phila.	57.11	57.11	57.11	56.89	32.43
No. 2 Fdry, Birm.	48.88	48.88	48.88	48.88	26.88
No. 2 Fdry (Birm.) del. Cin.	55.49	55.49	55.49	55.58	30.94
Malleable, Valley	52.50	52.50	52.50	52.50	30.50
Malleable, Chicago	52.50	52.50	52.50	52.50	30.50
Charcoal, Lyles, Tenn.	66.00	66.00	66.00	66.00	37.50
Ferromanganese, Etna, Pa.	188.00	188.00	188.00	188.00	140.00*

* Delivered Pittsburgh.

SCRAP, Gross Ton (including broker's commission)

	Jan. 3 1952	Week Ago	Month Ago	Year Ago	5 Yrs Ago
No. 1 Heavy Melt, Pitts.	$44.00	$44.00	$44.00	$46.50	$32.50
No. 1 Heavy Melt, E. Pa.	42.50	42.50	42.50	45.00	31.00
No. 1 Heavy Melt, Chicago	42.50	42.50	42.50	45.00	30.00
No. 1 Heavy Melt, Valley	44.00	44.00	44.00	46.25	32.50
No. 1 Heavy Melt, Cleve.	43.00	43.00	43.00	45.75	32.50
No. 1 Heavy Melt, Buffalo	43.00	43.00	43.00	44.88	29.00
Rails, Rerolling, Chicago	52.50	52.50	52.50	67.00	34.75
No. 1 Cast, Chicago	49.00*	49.00*	49.00*	63.00	40.00

* F.o.b. shipping point.

COKE, Net Ton

	Jan. 3 1952	Week Ago	Month Ago	Year Ago	5 Yrs Ago
Beehive, Furn., Connlsvl.	$14.75	$14.75	$14.75	$14.75	$8.75
Beehive, Fdry., Connlsvl.	17.50	17.50	17.50	17.50	9.50
Oven Fdry., Chicago	23.00	23.00	23.00	21.00	14.35

NONFERROUS METALS

	Jan. 3 1952	Week Ago	Month Ago	Year Ago	5 Yrs Ago
Copper, del. Conn.	24.50	24.50	24.50	24.50	19.50
Zinc, E. St. Louis	19.50	19.50	19.50	17.50	10.50
Lead, St. Louis	18.80	18.80	18.80	16.80	12.35-40
Tin, New York	103.00	103.00	103.00	157.00	70.00
Aluminum, del.	19.00	19.00	19.00	19.00	15.00
Antimony, Laredo, Tex.	50.00	50.00	50.00	32.00	28.25
Nickel, refinery, duty paid	56.50	56.50	56.50	50.50	35.00

PIG IRON

F.o.b. furnace prices quoted under GCPR as reported to STEEL. Minimum delivered prices are approximate and do not include 3% federal tax. Key to producing companies published on second following page.

PIG IRON, Gross Ton

	Basic	No. 2 Foundry	Malleable	Bessemer
Bethlehem, Pa. B2	$54.00	$54.50	$55.00	$55.50
Brooklyn, N.Y., del.		59.18	59.68	....
Newark, del.	56.87	57.37	57.87	58.37
Philadelphia, del.	56.61	57.11	57.61	58.11
Birmingham District				
AlabamaCity, Ala. R2	48.38	48.88	....	....
Birmingham R2	48.38	48.88	....	....
Birmingham S9	48.38	48.88	....	....
Woodward, Ala. W15	48.38	48.88	....	....
Cincinnati, del.		55.49	....	....
Buffalo District				
Buffalo R2	52.00	52.50	53.00	....
Buffalo H1	52.00	52.50	53.00	....
Tonawanda, N.Y. W12	52.00	52.50	53.00	....
No. Tonawanda, N.Y. T9		52.50	53.00	....
Boston, del.	62.11	62.61	63.11	....
Rochester, N.Y., del.	54.88	55.38	55.88	....
Syracuse, N.Y., del.	55.91	56.41	56.91	....
Chicago District				
Chicago I-3	52.00	52.50	52.50	53.00
Gary, Ind. U5	52.00	....	52.50	....
IndianaHarbor, Ind. I-2	52.00		52.50	
So.Chicago, Ill. W14	52.00	52.50	52.50	....
So.Chicago, Ill., Y1	52.00	52.50	52.50	....
So.Chicago, Ill. U5	52.00	....	52.50	53.00
Milwaukee, del.	54.06	54.56	54.56	55.06
Muskegon, Mich., del.		58.47	58.47	....
Cleveland District				
Cleveland A7	52.00	52.50	52.50	53.00
Cleveland R2	52.00	52.50	52.50	....
Akron, O., del. from Cleve.	54.61	55.11	55.11	55.61
Lorain, O. N3	52.00	....		53.00
Duluth I-3		....	52.50	....
Erie, Pa. I-3	52.00	52.50	52.50	53.00
Everett, Mass. E1	....	57.00	57.50	....
Fontana, Calif. K1	58.00	58.50	....	....
Seattle, Tacoma, Wash., del.	....	60.66	....	....
Portland, Oreg., del.		60.66	....	....
LosAngeles, SanFrancisco, del.	60.16	60.66	....	....
GraniteCity, Ill. G4	53.90	54.40	54.90	....
St. Louis, del. (inc. tax)	54.66	55.16	55.66	....
Ironton, Utah, C11	52.00	52.50	....	....
Geneva, Utah C11	52.00	52.50	....	....
LoneStar, Tex. L6	48.00	*48.50	48.50	....
Minnequa, Colo. C10	54.00	55.00	55.00	....
Pittsburgh District				
NevilleIsland, Pa. P6	....	52.50	52.50	53.00
Pitts., N.&S. sides, Ambridge, Aliquippa, del.		53.80	53.80	54.30
McKeesRocks, del.		53.54	53.54	54.04
Lawrenceville, Homestead, McKeesport, Monaca, del.		54.07	54.07	54.57
Verona, del.		54.57	54.57	55.07
Brackenridge, del.		54.82	54.82	55.32
Bessemer, Pa. U5	52.00	....	52.50	53.00
Clairton, Rankin, So.Duquesne, Pa. U5	52.00	....	....	....
McKeesport, Pa. N3	52.00	....	....	53.00
Monessen, Pa. P7	54.00	....	....	....
Sharpsville, Pa. S6		....	52.50	53.00
Steelton, Pa. B2	54.00	54.50	55.00	55.50
Swedeland, Pa. A3	56.00	56.50	57.00	57.50
Toledo, O. I-3	52.00	52.50	52.50	53.00
Cincinnati, del.	57.47	57.97		
Troy, N.Y. R2	54.00	54.50	55.00	55.50
Youngstown District				
Hubbard, O. Y1	52.00	52.50	52.50	....
Youngstown Y1	52.00	52.50	52.50	....
Youngstown U5	52.00	....	....	53.00
Mansfield, O., del.	56.65	57.15	57.15	57.65

* Low phos. southern grade.

PIG IRON DIFFERENTIALS

Silicon: Add 50 cents per ton for each 0.25% Si over base grade, 1.75-2.25%, except on low phos iron on which base is 1.75-2.00%.

Phosphorus: Deduct 38 cents per ton for P content of 0.70% and over.

Manganese: Add 50 cents per ton for each 0.50% manganese over 1% or portion thereof.

Nickel: Under 0.50% no extra; 0.50-0.74%, incl., add $2 per ton and each additional 0.25%, add $1 per ton.

BLAST FURNACE SILVERY IRON, Gross Ton

(Base 6.00-6.50% silicon; add $1.50 for each 0.5% Si)

Jackson, O. G2, J1	$62.50
Buffalo H1	63.75

ELECTRIC FURNACE SILVERY PIG IRON, Gross Ton

(Base 14.01-14.50% silicon; add $1 for each 0.5% Si to 18%; $1 for each 0.5% Mn over 1%; $1 for each 0.045% max. P)

NiagaraFalls, N.Y. P15	$88.00
Keokuk, Iowa, Openhearth & Fdry, frt. allowed K2	92.50
Keokuk, OH & Fdry., 12½ lb piglets, 16% Si, frt. allowed K2	95.50
Wenatchee, Wash., O.H. & Fdry., frt. allowed K2	92.50

CHARCOAL PIG IRON, Gross Ton

(Low phos semi-cold blast; differential charged for silicon over base grade; also for hard chilling iron Nos. 5 & 6)

Lyles, Tenn. T3	$66.00

LOW PHOSPHOROUS PIG IRON, Gross Ton

Cleveland, intermediate, A7	$57.00
Steelton, Pa. B2	60.00
Philadelphia delivered	63.37
Troy, N.Y. R2	60.00

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Semifinished and Finished Steel Products

Mill prices quoted under GCPR as reported to STEEL, Jan. 3, 1952; cents per pound except as otherwise noted. Changes shown in Italics. Code numbers following mill points indicate producing company; key on next two pages

INGOTS, Carbon, Forging (NT)

Fontana,Calif. K1	$79.00
Munhall,Pa. U5	52.00

INGOTS, Alloy (NT)

Detroit R7	$54.00
Fontana,Calif. K1	80.00
Houston,Tex. S5	62.00
Midland,Pa. C18	54.00
Munhall,Pa. U5	54.00

BILLETS, BLOOMS & SLABS

Carbon, Rerolling (NT)

Bessemer,Pa. U5	$56.00
Clairton,Pa. U5	56.00
Ensley,Ala. T2	56.00
Fairfield,Ala. T2	56.00
Fontana,Calif. K1	75.00
Gary,Ind. U5	56.00
Johnstown,Pa. B2	56.00
Lackawanna,N.Y., B2	56.00
Munhall,Pa. U5	56.00
So.Chicago,Ill. U5	56.00
So.Duquesne,Pa. U5	56.00

Carbon, Forging (NT)

Bessemer,Pa. U5	$66.00
Buffalo R2	66.00
Canton,O. R2	66.00
Clairton,Pa. U5	66.00
Cleveland R2	66.00
Conshohocken,Pa. A3	73.00
Detroit R7	69.00
Ensley,Ala. T2	66.00
Fairfield,Ala. T2	66.00
Fontana,Calif. K1	85.00
Gary,Ind. U5	66.00
Geneva,Utah C11	66.00
Houston,Tex. S5	74.00
Johnstown,Pa. B2	66.00
Lackawanna,N.Y. B2	66.00
LosAngeles B3	85.00
Munhall,Pa. U5	66.00
Seattle B3	85.00
So.Chicago R2,U5,W14	66.00
So.Duquesne,Pa. U5	66.00
So.SanFrancisco B3	85.00

Alloy, Forging (NT)

Bethlehem,Pa. B2	$70.00
Buffalo R2	70.00
Canton,O. R2	70.00
Canton,O.(29) T7	66.00
Conshohocken,Pa. A3	77.00
Detroit R7	73.00
Fontana,Calif. K1	89.00
Gary,Ind. U5	70.00
Houston,Tex. S5	78.00
Ind.Harbor,Ind. Y1	70.00
Johnstown,Pa. B2	70.00
Lackawanna,N.Y. B2	70.00
LosAngeles B3	90.00
Massillon,O. R2	70.00
Midland,Pa. C18	70.00
Munhall,Pa. U5	70.00
So.Chicago R2,U5,W14	70.00
So.Duquesne,Pa. U5	70.00
Struthers,O. Y1	70.00
Warren,O. C17	70.00

ROUNDS, SEAMLESS TUBE (NT)

Canton,O. R2	$82.00
Cleveland R2	82.00
Fontana,Calif. K1	103.00
Gary,Ind. U5	82.00
Massillon,O. R2	82.00
So.Chicago,Ill. R2	82.00
So.Duquesne,Pa. U5	82.00

SHEET BARS (NT)

Fontana,Calif. K1	$89.00

SKELP

Aliquippa,Pa. J5	$3.45
Munhall,Pa. U5	3.35
Warren,O. R2	3.35
Youngstown R2, U5	3.35

WIRE RODS

Alton,Ill. L1	4.40
AlabamaCity,Ala. R2	4.10
Buffalo W12	4.10
Cleveland A7	4.10
Donora,Pa. A7	4.10
Fairfield,Ala. T2	4.10
Fontana,Calif. K1	4.90
Houston,Tex. S5	4.50
Johnstown,Pa. B2	4.10
Joliet,Ill. A7	4.10
LosAngeles B3	4.90
Minnequa,Colo. C10	4.35
Monessen,Pa. P7	4.30
No.Tonawanda,N.Y. B11	4.10
Pittsburg,Calif. C11	4.75
Portsmouth,O. P12	4.30
Roebling,N.J. R5	4.20
So.Chicago,Ill. R2	4.10
SparrowsPoint,Md. B2	4.20
Sterling,Ill.(1) N15	4.10
Struthers,O. Y1	4.10
Torrance,Calif. C11	4.90
Worcester,Mass. A7	4.40

SHEET STEEL PILING

Ind.Harbor,Ind. I-2	4.45
Lackawanna,N.Y. B2	4.45
Munhall,Pa. U5	4.45
So.Chicago,Ill. U5	4.45

STRUCTURALS

Carbon Steel Stand., Shapes

AlabamaCity,Ala. R2	3.60
Aliquippa,Pa. J5	3.65
Bessemer,Ala. T2	3.65
Bethlehem,Pa. B2	3.70
Clairton,Pa. U5	3.65
Fairfield,Ala. T2	3.65
Fontana,Calif. K1	4.25
Gary,Ind. U5	3.65
Geneva,Utah C11	3.65
Houston,Tex. S5	4.05
Ind.Harbor,Ind. I-2	3.65
Johnstown,Pa. B2	3.70
KansasCity,Mo. S5	4.25
Lackawanna,N.Y. B2	3.70
LosAngeles B3	4.25
Minnequa,Colo. C10	4.10
Munhall,Pa. U5	3.65
Niles,Calif.(22) P1	4.85
Phoenixville,Pa. P4	5.90
Portland,Oreg. O4	4.50
Seattle B3	4.30
So.Chicago,Ill. U5, W14	3.65
So.SanFrancisco B3	4.20
Torrance,Calif. C11	4.25
Weirton,W.Va. W6	3.90

Alloy Stand. Shapes

Clairton,Pa. U5	4.35
Fontana,Calif. K1	5.55
Munhall,Pa. U5	4.35
So.Chicago,Ill. U5	4.35

H.S., L.A. Stand. Shapes

Aliquippa,Pa. J5	5.50
Bessemer,Ala. T2	5.50
Bethlehem,Pa.(14) B2	5.50
Clairton,Pa. U5	5.50
Fairfield,Ala. T2	5.50
Fontana,Calif. K1	6.10
Gary,Ind. U5	5.50
Geneva,Utah C11	5.50
Ind.Harbor,Ind. I-2	5.50
Ind.Harbor,Ind. Y-1	6.00
Johnstown,Pa. B2	5.50
Lackawanna,N.Y.(14)B2	5.50
LosAngeles B3	6.05
Munhall,Pa. U5	5.50
Seattle B3	6.10
So.Chicago,Ill. U5	5.50
So.SanFrancisco B3	6.00
Struthers,O. Y1	6.00

Wide Flange

Bethlehem,Pa. B2	3.70
Clairton,Pa. U5	3.65
Fontana,Calif. K1	4.65
Lackawanna,N.Y. B2	3.70
Munhall,Pa. U5	3.65
So.Chicago,Ill. U5	3.65

H.S., L.A. Wide Flange

Bethlehem,Pa. B2	5.50
Lackawanna,N.Y. B2	5.50
Munhall,Pa. U5	5.45
So.Chicago,Ill. U5	5.45

BEARING PILES

Munhall,Pa. U5	3.65
So.Chicago,Ill. U5	3.65

PLATES, High-Strength Low-Alloy

Aliquippa,Pa. J5	5.65
Bessemer,Ala. T2	5.65
Clairton,Pa. U5	5.65
Cleveland J5, R2	5.65
Conshohocken,Pa. A3	5.90
Fairfield,Ala. T2	5.65
Fontana,Calif.(30) K1	6.25
Gary,Ind. U5	5.65
Geneva,Utah C11	5.65
Ind.Harbor,Ind. I-2	5.65
Ind.Harbor,Ind. Y1	6.15
Johnstown,Pa. B2	5.65
Munhall,Pa. U5	5.65
Pittsburgh J5	5.65
Seattle B3	6.55
Sharon,Pa. S3	5.70
So.Chicago,Ill. U5	5.65
SparrowsPoint,Md. B2	5.65
Warren,O. R2	5.65
Youngstown Y1	6.15

PLATES, Open-Hearth Alloy

Claymont,Del. C22	4.85
Coatesville,Pa. L7	5.25
Conshohocken,Pa. A3	5.05
Fontana,Calif. K1	5.70
Gary,Ind. U5	4.75
Johnstown,Pa. B2	4.75
Munhall,Pa. U5	4.75
Sharon,Pa. S3	5.20
So.Chicago,Ill. U5	4.75
SparrowsPoint,Md. B2	4.75

FLOOR PLATES

Cleveland J5	4.75
Conshohocken,Pa. A3	4.75
Ind.Harbor,Ind. I-2	4.75
Munhall,Pa. U5	4.75
So.Chicago,Ill. U5	4.75

PLATES, Ingot Iron

Ashland,c.l.(15) A10	3.95
Ashland,lcl(15) A10	4.45
Cleveland,c.l. R2	4.30
Warren,O.c.l. R2	4.30

PLATES, Carbon Steel

AlabamaCity,Ala. R2	3.70
Aliquippa,Pa. J5	3.70
Ashland,Ky. (15) A10	3.70
Bessemer,Ala. T2	3.70
Clairton,Pa. U5	3.70
Claymont,Del. C22	4.15
Cleveland J5, R2	3.70
Coatesville,Pa. L7	4.75
Conshohocken,Pa. A3	4.15
Fairfield,Ala. T2	3.70
Fontana,Calif. (30) K1	4.30
Gary,Ind. U5	3.70
GraniteCity,Ill. G4	4.40
Geneva,Utah C11	3.70
Harrisburg,Pa. C5	6.30
Houston,Tex. S5	4.10
Ind.Harbor,Ind. I-2, Y1	3.70
Johnstown,Pa. B2	3.70
Lackawanna,N.Y. B2	3.70
Minnequa,Colo. C10	4.50
Munhall,Pa. U5	3.70
Pittsburgh J5	3.70
Seattle B3	4.60
Sharon,Pa. S3	3.95
So.Chicago,Ill. U5, W14	3.70
SparrowsPoint,Md. B2	3.70
Steubenville,O. W10	3.70
Warren,O. R2	3.70
Weirton,W.Va. W6	4.00
Youngstown R2, U5, Y1	3.70

PLATES, Carbon A.R.

Fontana,Calif. K1	5.45
Geneva,Utah C11	4.85

PLATES, Wrought Iron

Economy,Pa. B14	8.60

BARS, Hot-Rolled Carbon

AlabamaCity,Ala. R2	3.70
Aliquippa,Pa. J5	3.70
Alton,Ill. L1	4.15
Atlanta,Ga. A11	4.25
Bessemer,Ala. T2	3.70
Buffalo R2	3.70
Canton,O. R2	3.70
Clairton,Pa. U5	3.70
Cleveland R2	3.70
Detroit R7	3.85
Emeryville,Calif. J7	4.45
Fairfield,Ala. T2	3.70
Fontana,Calif. K1	4.40
Gary,Ind. U5	3.70
Houston,Tex. S5	4.10
Ind.Harbor,Ind. I-2, Y1	3.70
Johnstown,Pa. B2	3.70
KansasCity,Mo. S5	4.30
Lackawanna,N.Y. B2	3.70
LosAngeles B3	4.40
Milton,Pa. B6	4.20
Minnequa,Colo. C10	4.15
Niles,Calif. P1	5.05
N.Tonawanda,N.Y. B11	3.70
Pittsburg, Calif. C11	4.40
Pittsburgh J5	3.70
Portland,Oreg. O4	4.65
Seattle B3, N14	4.45
Struthers,O. Y1	3.70
Torrance,Calif. C11	4.40
Weirton,W.Va. W6	3.85
So.Chicago R2, U5, W14	3.70
So.Duquesne,Pa. U5	3.70
So.SanFran.,Cal. B3	4.45
Youngstown R2, U5	3.70

BAR SIZE ANGLES; S. SHAPES

Aliquippa,Pa. J5	3.70
Atlanta A11	4.25
Johnstown,Pa. B2	3.70
Lackawanna,N.Y. B2	3.70
Niles,Calif. P1	5.05
Portland,Oreg. O4	4.65
SanFrancisco S7	4.85

BAR SIZE ANGLES; H.R. CARBON

Bethlehem,Pa. B2	3.90

BARS, Hot-Rolled Alloy

Bethlehem,Pa. B2	4.30
Buffalo R2	4.30
Canton,O. R2	4.30
Canton,O.(29) T7	3.95
Clairton,Pa. U5	4.30
Detroit R7	4.45
Ecorse,Mich. G5	4.65
Fontana,Calif. K1	5.35
Gary,Ind. U5	4.30
Houston,Tex. S5	4.70
Ind.Harbor,Ind. I-2, Y1	4.30
Johnstown,Pa. B2	4.30
KansasCity,Mo. S5	4.90
Lackawanna,N.Y. B2	4.30
LosAngeles B3	5.35
Massillon,O. R2	4.30
Midland,Pa. C18	4.30
So.Chicago R2, U5, W14	4.30
So.Duquesne,Pa. U5	4.30
Struthers,O. Y1	4.30
Warren,O. C17	4.30
Youngstown U5	4.30

BAR SHAPES, Hot-Rolled Alloy

Clairton,Pa. U5	4.55
Gary,Ind. U5	4.55
Youngstown U5	4.55

BARS & SMALL SHAPES, H.R., High-Strength Low-Alloy

Aliquippa,Pa. J5	5.55
Bessemer,Ala. T2	5.55
Bethlehem,Pa. B2	5.55
Clairton,Pa. U5	5.55
Cleveland R2	5.55
Fairfield,Ala. T2	5.55
Fontana,Calif. K1	6.60
Gary,Ind. U5	5.55
Ind.Harbor,Ind. I-2	5.55
IndianaHarbor,Ind. Y1	6.05
Johnstown,Pa. B2	5.55
Lackawanna,N.Y. B2	5.55
LosAngeles B3	6.25
Pittsburgh J5	5.55
Seattle B3	6.30
So.Duquesne,Pa. U5	5.55
So.SanFrancisco B3	6.30
Struthers,O. Y1	6.05
Youngstown U5	5.55

BARS, Cold-Finished Carbon

Ambridge,Pa. W18	4.55
BeaverFalls,Pa. M12,R2	4.55
Buffalo B5	4.60
Camden,N.J. P13	5.00
Carnegie,Pa. C12	4.55
Chicago W18	4.55
Cleveland A7, C20	4.55
Detroit P17	4.70
Donora,Pa. A7	4.55
Elyria,O. W8	4.55
FranklinPark,Ill. N5	4.55
Gary,Ind. R2	4.55
GreenBay,Wis. F7	4.55
Hammond,Ind. L2, M13	4.55
Hartford,Conn. R2	5.10
Harvey,Ill. B5	4.55
LosAngeles R2	6.00
Mansfield,Mass. B5	5.10
Massillon,O. R2, R8	4.55
Monaca,Pa. S17	4.55
Newark,N.J. W18	5.00
Plymouth,Mich. P5	4.80
Pittsburgh J5	4.55
Putnam,Conn. W18	5.10
Readville,Mass. C14	5.10
St.Louis,Mo. M5	4.95
So.Chicago,Ill. W14	4.55
SpringCity,Pa. (5) K3	5.00
Struthers,O. Y1	4.55
Waukegan,Ill. A7	4.55
Youngstown F3, Y1	4.55

BARS, Cold-Finished Alloy

Ambridge,Pa. W18	5.40
BeaverFalls,Pa. M12	5.40
Bethlehem,Pa. B2	5.40
Buffalo B5	5.40
Camden,N.J. P13	5.80
Canton,O. R2	5.40
Canton,O.(29) T7	4.90
Carnegie,Pa. C12	5.40
Chicago W18	5.40
Cleveland A7	5.45
Cleveland C20	5.40
Detroit P17	5.55
Donora,Pa. A7	5.45
Elyria,O. W8	5.40
Gary,Ind. R2	5.40
Hammond,Ind. L2, M13	5.40
Hartford,Conn. R2	5.85
Harvey,Ill. B5	5.40
Lackawanna,N.Y. B2	5.40
Mansfield,Mass. B5	5.85
Massillon,O. R2, R8	5.40
Midland,Pa. C18	5.40
Monaca,Pa. S17	5.40
Newark,N.J. W18	5.75
Plymouth,Mich. P5	5.60
So.Chicago,Ill. R2, W14	5.40
Struthers,O. Y1	5.40
Warren,O. C17	5.40
Waukegan,Ill. A7	5.45
Worcester,Mass. A7	5.75
Youngstown F3, Y1	5.40

RAIL STEEL BARS

ChicagoHts.(3,4) C2	4.75
ChicagoHts.(3,4) I-2	4.75
Franklin,Pa. (3,4) F5	4.75
FortWorth,Tex.(26) T4	4.85
Huntngtn,W.Va.(3) W7	5.50
Marion,O.(3) P11	4.75
Moline,Ill.(3) R2	3.80
Tonawanda (3,4) B12	4.75
Williamsport(3) S19	5.00
Williamsport(4) S19	5.10

BARS, Wrought Iron

Dover,N.J.(Staybolt)U1	15.00
Dover,(Eng.Bolt) U1	13.50
Dover,(Wrgh.Iron) U1	12.25
Economy,Pa. (S.R.)B14	9.60
Economy,Pa.(D.R.)B14	11.90
Economy,(Staybolt)B14	12.20
McK.Rks.(Staybolt)L5	14.50
McK.Rks.(S.R.) L5	9.60
McK.Rks.(D.R.) L5	13.00

BARS, Reinforcing (Fabricators)

AlabamaCity,Ala. R2	3.70
Atlanta A11	4.25
Buffalo R2	3.70
Cleveland R2	3.70
Emeryville,Calif. J7	4.45
Fairfield,Ala. T2	3.70
Fontana,Calif. K1	4.40
Gary,Ind. U5	3.70
Houston,Tex. S5	4.10
Ind.Harbor,Ind. I-2, Y1	3.70
Johnstown,Pa. B2	3.70
KansasCity,Mo. S5	4.30
Lackawanna,N.Y. B2	3.70
LosAngeles B3	4.40
Milton,Pa. B6	4.20
Minnequa,Colo. C10	4.50
Niles,Calif. P1	5.05
Pittsburg,Calif. C11	4.40
Pittsburgh J5	3.70
Portland,Oreg. O4	4.65
SandSprings,Okla. S5	4.60
Seattle B3, N14	4.45
So.Chicago,Ill. R2	3.70
So.Duquesne,Pa. U5	3.70
So.SanFrancisco B3	4.45
SparrowsPoint,Md. B2	3.70
Struthers,O. Y1	3.70
Torrance,Calif. C11	4.40
Youngstown R2, U5	3.70

BARS, Reinforcing

(Fabricated; to Consumers)

Huntington,W.Va. W7	5.50
Johnstown, ¼-1" B2	4.75
LosAngeles B3	5.45
Marion,O. P11	5.00
Seattle B3, N14	5.55
So.SanFrancisco B3	5.45
SparrowsPt. ¼-1" B2	4.75
Williamsport,Pa. S19	5.10

SHEETS, Hot-Rolled Steel

(18 gage and heavier)

AlabamaCity,Ala. R2	3.60
Ashland,Ky.(8) A10	3.60
Butler,Pa. A10	3.60
Cleveland J5, R2	3.60
Conshohocken,Pa. A3	4.00
Detroit M1	4.40
Ecorse,Mich.(8) G5	3.80
Fairfield,Ala. T2	3.60
Fontana,Calif. K1	4.55
Gary,Ind. U5	3.60
Geneva,Utah C11	3.70
GraniteCity,Ill. G4	4.30
Ind.Harbor,Ind. I-2, Y1	3.60
Irvin,Pa. U5	3.60
Lackawanna,N.Y. B2	3.60
Munhall,Pa. U5	3.60
Niles,O. N12	5.25
Pittsburg,Calif. C11	4.30
Pittsburgh J5	3.60
Sharon,Pa. S3	4.00
So.Chicago,Ill. W14	3.60
SparrowsPoint,Md. B2	3.60
Steubenville,O. W10	3.60
Torrance,Calif. C11	4.30
Warren,O. R2	3.60
Weirton,W.Va. W6	3.60
WestLeechburg,Pa. A4	3.75
Youngstown U5, Y1	3.60

SHEETS, H.R., (19 gage)

AlabamaCity,Ala. R2	4.75
Dover,O. R1	5.65
Ind.Harbor,Ind. I-2	5.40
Mansfield,O. E6	5.65
Niles,O. N12	5.75
Torrance,Calif. C11	5.40

SHEETS, H.R., (14-ga., heavier)

High-Strength Low-Alloy

Cleveland J5, R2	5.40
Conshhocken,Pa. A3	5.65
Ecorse,Mich. G5	5.95
Fairfield,Ala. T2	5.40
Fontana,Calif. K1	6.35
Gary,Ind. U5	5.40
Ind.Harbor,Ind. I-2	5.40
IndianaHarbor,Ind. Y1	5.90
Irvin,Pa. U5	5.40
Lackawanna(35) B2	5.40
Pittsburgh J5	5.40
Sharon,Pa. S3	5.40
So.Chicago,Ill. U5	5.40
SparrowsPoint (36) B2	5.40
Warren,O. R2	5.40
Weirton,W.Va. W6	5.75
Youngstown U5	5.40
Youngstown Y1	5.90

SHEETS, Cold-Rolled

High-Strength Low-Alloy

Cleveland J5, R2	6.55
Ecorse,Mich. G5	7.10
Fontana,Calif. K1	7.50
Gary,Ind. U5	6.55
IndianaHarbor,Ind. Y1	7.05
IndianaHarbor,Ind. I-2	6.55
Irvin,Pa. U5	6.55
Lackawanna(37) B2	6.55
Pittsburgh J5	6.55
SparrowsPoint(38) B2	6.55
Warren,O. R2	6.55
Weirton,W.Va. W6	6.90
Youngstown Y1	7.05

SHEETS, Cold-Rolled Steel (Commercial Quality)

Butler,Pa. A10	4.35
Cleveland J5, R2	4.35
Ecorse,Mich. G5	4.55
Fairfield,Ala. T2	4.35
Follansbee,W.Va. F4	4.35
Fontana,Calif. K1	5.30
Gary,Ind. U5	4.35
GraniteCity,Ill. G4	5.05
Ind.Harbor,Ind. I-2, Y1	4.35
Irvin,Pa. U5	4.35
Lackawanna,N.Y. B2	4.35
Middletown,O. A10	4.35
Pittsburg,Calif. C11	5.30
Pittsburgh J5	4.35
SparrowsPoint,Md. B2	4.35
Steubenville,O. W10	4.35
Warren,O. R2	4.35
Weirton,W.Va. W6	4.35
Youngstown Y1	4.35

SHEETS, Galv'd No. 10 Steel

AlabamaCity,Ala. R2	4.80
Ashland,Ky. (8) A10	4.80
Canton,O. R2	4.80
Dover,O. E1	5.50
Fairfield,Ala. T2	4.80
Gary,Ind. U5	4.80
GraniteCity,Ill. G4	5.50
Ind.Harbor,Ind. I-2	4.80
Irvin,Pa. U5	4.80
Kokomo,Ind. (13) C16	5.20
MartinsFerry,O. W10	4.80
Niles,O. N12	6.00
Pittsburg,Calif. C11	5.55
SparrowsPoint,Md. B2	4.80
Steubenville,O. W10	4.80
Torrance,Calif. C11	5.55
Weirton,W.Va. W6	4.80

SHEETS, Galvanized No. 10, High-Strength Low-Alloy

Irvin,Pa. U5	7.20
SparrowsPoint(39) B2	6.75

SHEETS, Galvannealed Steel

Canton,O. R2	5.35
Irvin,Pa. U5	5.35
Kokomo,Ind. (13) C16	5.45
Niles,O. N12	6.55

SHEETS, ZINCGRIP Steel No. 10

Butler,Pa. A10	5.05
Middletown,O. A10	5.05

SHEETS, Electro Galvanized

Cleveland R2 (28)	5.65
Niles,O. R2 (28)	5.65
Weirton,W.Va. W6	5.50

SHEETS, Zinc Alloy

Ind.Harbor,Ind. I-2	5.70

SHEETS, Drum Body

Pittsburg,Calif. C11	4.30
Torrance,Calif. C11	4.30

SHEETS, Well Casing

Fontana,Calif. K1	5.10
Torrance,Calif. C11	5.10

BLUED Stock, 29 ga

Yorkville,O. W10	6.80
Follansbee,W.Va. (23) F4	6.85

SHEETS, Enameling Iron

Ashland,Ky. (8) A10	4.65
Cleveland R2	4.65
Gary,Ind. U5	4.65
GraniteCity,Ill. G4	5.35
Ind. Harbor,Ind. I-2	4.65
Irvin,Pa. U5	4.65
Middletown,O. A10	4.65
Youngstown Y1	4.65

BLACK PLATE (Base Box)

Aliquippa,Pa. J5	$6.25
Fairfield,Ala. T2	6.35
Gary,Ind. U5	6.25
GraniteCity,Ill. G4	6.45
Ind.Harbor,Ind. I-2, Y1	6.25
Irvin,Pa. U5	6.25
Niles,O. R2	6.25
Pittsburg,Calif. C11	7.00
SparrowsPoint,Md. B2	6.35
Warren,O. R2	6.25
Weirton,W.Va. W6	6.25
Yorkville,O. W10	6.25

HOLLOWARE ENAMELING Black Plate (29 gage)

Follansbee,W.Va. F4	5.85
Gary,Ind. U5	5.85
GraniteCity,Ill. G4	6.05
Ind.Harbor,Ind. Y1	5.90
Irvin,Pa. U5	5.85
Yorkville,O. W10	6.15

SHEETS, Culvert No. 16	Cu Alloy	Cu Fe
Ashland,Ky. A10	5.60	
Canton,O. R2	5.65	6.10
Fairfield,Ala. T2	5.60	5.85
Gary,Ind. U5	5.60	5.85
IndianaHarbor I-2	5.60	5.85
Irvin,Pa. U5	5.60	5.85
Kokomo,Ind. C16	6.25	
MartinsFy,O. W10	5.60	5.85
Pittsburg,Cal. C11	6.35	
SparrowsPt. B2	5.60	
Torrance,Cal. C11	6.35	

SHEETS, Culvert, No. 16 Pure Iron

Ashland,Ky. A10	5.85
Fairfield,Ala. T2	5.85

SHEETS, Hot-Rolled Ingot Iron 18 Gage and Heavier

Ashland,Ky. (8) A10	3.85
Cleveland R2	4.20
Ind.Harbor,Ind. I-2	3.85
Warren,O. R2	4.20

SHEETS, Cold-Rolled Ingot Iron

Cleveland R2	4.95
Middletown,O. A10	4.85
Warren,O. R2	4.95

SHEETS, Galvanized Ingot Iron No. 10 flat

Ashland,Ky. (8) A10	5.05
Canton,O. R2	5.55

SHEETS, ZINCGRIP Ingot Iron

Butler,Pa. A10	5.30
Middletown,O. A10	5.30

SHEETS, ALUMINIZED

Butler,Pa. A10	8.15

TIN PLATE, Electrolytic (Base Box)	0.25-lb	0.50 lb	0.75lb
Aliquippa,Pa. J5	$7.15	$7.40	$7.80
Fairfield,Ala. T2	7.25	7.50	7.90
Gary,Ind. U5	7.15	7.40	7.80
GraniteCity,Ill. G4	7.35	7.60	8.00
Ind.Harbor,Ind. I-2, Y1	7.15	7.40	7.80
Irvin,Pa. U5	7.15	7.40	7.80
Niles,O. R2	7.15	7.40	7.80
Pittsburg,Calif. C11	7.90	8.15	8.55
SparrowsPoint,Md. B2	7.25	7.50	7.90
Weirton,W.Va. W6	7.15	7.40	7.80
Yorkville,O. W10	7.15	7.40	7.80

SHEETS, SILICON, H.R. or C.R. (22 Ga.) COILS (Cut Lengths ½c lower)	Field	Armature	Electric	Motor	Dynamo
BeechBottom W10 (cut lengths)			7.25	8.50	9.30
Brackenridge,Pa. A4			7.75	9.00	9.80
GraniteCity,Ill.G4 (cut lengths)			7.95	9.20	
Ind.Harbor,Ind. I-2	6.95	7.25	(34)		
Mansfield,O. E6 (cut lengths)	7.10	7.25	7.75	9.00	9.80
Niles,O. N12 (cut lengths)		6.75	7.25		
Vandergrift,Pa. U5		7.25	7.75	9.00	9.80
Warren,O. R2	6.95	7.25	7.75	9.00	9.80
Zanesville,O. A10		7.25	7.75	9.00	9.80

SHEETS, SILICON (22 Ga. Base) Coils (Cut Lengths ½c lower) Transformer Grade	72	65	58	52
BeechBottom W10 (cut lengths)	9.85	10.40	11.10	11.90
Brackenridge,Pa. A4	10.35			
Vandergrift,Pa. U5	10.35	10.90	11.60	12.40
Warren,O. R2	10.35			
Zanesville,O. A10	10.35	10.90	11.60	12.40

H.R. or C.R. COILS AND CUT LENGTHS, SILICON (22 Ga.)	T-100	T-90	T-80	T-73
Butler,Pa. A10 (C.R.)			14.75	15.25
Vandergrift,Pa. U5	12.90	13.75	14.75	15.25

TINPLATE, American Coke (Base Box)	1.25 lb	1.50 lb
Aliquippa,Pa. J5	$8.45	$8.70
Fairfield,Ala. T2	8.55	8.80
Gary,Ind. U5	8.45	8.70
Ind.Har. I-2, Y1	8.45	8.70
Irvin,Pa. U5	8.45	8.70
Pitts.Cal. C11	9.20	9.45
Sp.Pt. Md. B2	8.55	8.80
Warren,O. R2	8.45	8.70
Weirton,W.Va. W6	8.45	8.70
Yorkville,O. W10	8.45	8.70

MANUFACTURING TERNES (Special Coated)

Fairfield,Ala. T2	$7.60
Gary,Ind. U5	7.50
Irvin,Pa. U5	7.50
SparrowsPoint,Md. B2	7.60
Yorkville,O. W10	7.50

SHEETS, LT Coated Ternes, 6 lb

Yorkville,O. W10	$8.40

SHEETS, Mfg. Ternes, 8 lb (Commercial Quality)

Gary,Ind. U5	$9.50
Yorkville,O. W10	9.50

SHEETS, Long Terne Steel (Commercial Quality)

BeechBottom,W.Va. W10	5.20
Gary,Ind. U5	5.20
Mansfield,O. E6	6.65
Middletown,O. A10	5.20
Niles,O. N12	6.00
Weirton,W.Va. W6	5.20

SHEETS, Long Terne, Ingot Iron

Middletown,O. A10	5.60

ROOFING SHORT TERNES (8 lb Coated)

Gary,Ind. U5	9.50

STRIP, Hot-Rolled High-Strength Low-Alloy

Bessemer,Ala. T2	5.30
Conshohocken,Pa. A3	5.55
Ecorse,Mich. G5	5.95
Fairfield,Ala. T2	5.30
Fontana,Calif. K1	6.20
Gary,Ind. U5	5.30
Ind.Harb.,Ind. I-2	5.30
IndianaHarbor,Ind. Y1	5.80
Lackawanna,N.Y. B2	4.95
LosAngeles(25) B3	6.05
Seattle B3	6.30
Sharon,Pa. S3	5.40
So.SanFrancisco(25) B3	6.05
SparrowsPoint,Md. B2	4.95
Warren,O. R2	5.30
Weirton,W. Va. W6	5.75
Youngstown Y1	5.80
Youngstown U5	5.30

STRIP, Cold-Rolled High-Strength Low-Alloy

Cleveland J5	6.70
Cleveland A7	6.55
Dover,O. G6	7.30
Fontana,Calif. K1	6.95
Lackawanna,N.Y. B2	6.40
Sharon,Pa. S3	6.55
SparrowsPoint,Md. B2	6.40
Warren,O. R2	6.55
Weirton,W.Va. W6	7.20
Youngstown Y1	7.05

STRIP, Hot-Rolled Carbon

Ala.City,Ala. (27) R2	3.50
Alton,Ill. L1	3.95
Ashland,Ky. (8) A10	3.50
Atlanta A11	4.05
Bessemer, Ala. T2	3.50
Bridgeprt.Conn. (10) S15	4.00
Buffalo(27) R2	3.50
Butler,Pa. A10	3.50
Carnegie,Pa. S18	4.00
Conshohocken,Pa. A3	3.90
Detroit M1	4.40
Ecorse,Mich. G5	3.80
Fairfield,Ala. T2	3.50
Fontana,Calif. K1	4.75
Gary,Ind. U5	3.50
Houston,Tex. S5	3.90
Ind. Harbor,Ind. I-2, Y1	3.50
Johnstown,Pa. (25) B2	3.50
KansasCity,Mo. (9) S5	4.10
Lackawanna,N.Y. (32) B2	3.50
LosAngeles B3	4.25
Milton,Pa. B6	4.00
Minnequa,Colo. C10	4.55
NewBritain(10) S15	4.00
No.Tonawanda,N.Y. B11	3.50
Pittsburg,Calif. C11	4.25
Riverdale,Ill. A1	3.50
SanFrancisco S7	4.85
Seattle B3, N14	4.50
Sharon,Pa. S3	4.00
So.Chicago,Ill. W14	3.50
So.SanFrancisco B3	4.25
SparrowsPoint,Md. B2	3.50
Torrance,Calif. C11	4.25
Warren,O. R2	3.50
Weirton,W.Va. W6	3.60
WestLeechburg,Pa. A4	3.75
Youngstown U5, Y1	3.50

STRIP, Hot-Rolled Alloy

Bridgprt.Conn. (10) S15	5.45
Carnegie,Pa. S18	5.85
Fontana,Calif. K1	6.70
Gary,Ind. U5	5.50
Houston,Tex. S5	5.90
KansasCity,Mo. S5	6.10
Midland,Pa. C18	5.85
NewBritn.Conn. (10) S15	5.45
Sharon,Pa. S3	5.85
Youngstown U5	5.50

STRIP, Cold-Rolled Carbon

Anderson,Ind. (40) G6	5.50
Berea,O. C7	6.60
Bridgeprt,Conn. (10) S15	5.35
Butler,Pa. A10	4.65
Cleveland A7, J5	4.65
Dearborn,Mich. D3	5.60
Detroit D2	5.60
Detroit M1	5.45
Dover,O. (40) G6	5.50
Ecorse,Mich. G5	4.85
Follansbee,W.Va. F4	5.35
Fontana,Calif. K1	6.30
FranklinPark,Ill. (40) T6	4.90
Ind.Harbor,Ind. I-2	4.90
Lackawanna,N.Y. B2	4.65
LosAngeles C1	6.40
Mattapan,Mass. T6	5.50
Middletown,O. A10	4.65
NewBritain(10) S15	5.35
NewCastle,Pa. B4	5.35
NewCastle,Pa. (40) E5	5.25
NewHaven,Conn. D2	5.85
NewHaven,Conn. A7	5.15
Pawtucket,R.I. R3	6.00
Pawtucket,R.I. (21) N8	5.85
Riverdale,Ill. (40) A1	4.90
Rome,N.Y. R6	5.10
Sharon,Pa. S3	5.35
SparrowsPoint,Md. B2	4.65
Trenton,N.J. R5	6.00
Wallingford,Conn. W2	5.85
Warren,O. (40) T5	5.25
Warren,O. R2	4.65
Weirton,W.Va. W6	4.65
Youngstown C8 (40)	5.25
Youngstown Y1	4.65

STRIP, Electro Galvanized

Dover,O. G6	5.50
Warren,O. T5	5.25
Weirton,W.Va. W6	4.65
Youngstown C8	5.25

STRIP, Cold-Finished Spring Steel (Annealed)	0.26-0.40C	0.41-0.60C	0.61-0.80C	0.81-1.05C	1.06-1.35C
Berea,O. C7	....	6.80	7.40	9.35	11.65
Bridgeport,Conn. (10) S15	5.35	6.80	7.40	9.35	11.65
Bristol,Conn. W1	....		7.70	9.65	....
Carnegie,Pa. S18	....	6.80	7.40	9.35	11.65
Cleveland A7	4.65	6.45	7.40	9.35	11.65
Dearborn,Mich. D3	5.60	7.05	7.65	....	....
Detroit D2	5.60	6.65	7.25	....	....
Dover,O. G6	5.50	6.80	7.40	9.35	11.65
FranklinPark,Ill. T6	5.00	6.60	7.55	9.50	11.80
Harrison,N.J. C18			7.70	9.65	11.95
Mattapan,Mass. T6	5.50	6.75	7.70	9.65	11.95
NewBritn.,Conn. (10) S15	5.35	6.80	7.40	9.35	11.65
NewCastle,Pa. B4	5.35	6.80	7.40	9.35	....
NewCastle,Pa. E5	5.50	6.80	7.40	9.35	11.65
NewHaven,Conn. D2	5.85	6.75	7.35	....	....
NewYork W3		7.10	7.70	9.65	11.95
Pawtucket,R.I. N8:					
Cleve.orPitts.Base		6.80	7.40	9.35	11.65
Worcester,Mass.,Base	5.85	7.10	7.70	9.65	11.95
Sharon,Pa. S3	5.35	6.80	7.40	9.35	11.65
Trenton,N.J. R5		7.10	7.70	9.65	11.95
Wallingford,Conn. W2	5.85	6.75	7.35	9.30	11.60
Weirton,W.Va. W6	5.35	6.80	7.40	9.35	11.65
Worcester,Mass. A7	4.95	6.75	7.70	9.65	11.95
Worcester,Mass. T6	5.50	6.75	7.70	9.65	11.95
Youngstown C8		6.80	7.40	9.35	11.65
Spring Steel (Tempered)					
Trenton,N.J. R5			10.30	12.50	15.35
Harrison,N.J. C18			10.30	12.50	15.35
NewYork W3			10.30	12.50	15.35

Key to Producers

A1	Acme Steel Co.
A3	Alan Wood Steel Co.
A4	Allegheny Ludlum Steel
A7	American Steel & Wire
A8	Anchor Drawn Steel Co.
A9	Angell Nail & Chaplet
A10	Armco Steel Corp.
A11	Atlantic Steel Co.
A13	American Cladmetals Co.
B1	Babcock & Wilcox Co.
B2	Bethlehem Steel Co.
B3	Beth. Pac. Coast Steel
B4	Blair Strip Steel Co.
B5	Bliss & Laughlin Inc.
B6	Boardi Steel Corp.
B8	Braeburn Alloy Steel
B11	Buffalo Bolt Co.
B12	Buffalo Steel Co.
B14	A. M. Byers Co.
C1	Calstrip Steel Corp.
C2	Calumet Steel Div. Borg-Warner Corp.
C4	Carpenter Steel Co.
C5	Central Iron & Steel Div. Barium Steel Corp.
C7	Cleve. Cold Rolling Mills
C8	Cold Metal Products Co.
C9	Colonial Steel Co.
C10	Colorado Fuel & Iron
C11	Columbia-Geneva Steel
C12	Columbia Steel & Shaft
C13	Columbia Tool Steel Co.
C14	Compressed Steel Shaft
C16	Continental Steel Corp.
C17	Copperweld Steel Co.
C18	Crucible Steel Co.
C19	Cumberland Steel Co.
C20	Cuyahoga Steel & Wire
C22	Claymont Steel Corp.
D2	Detroit Steel Corp.
D3	Detroit Tube & Steel
D4	Disston & Sons, Henry
D6	Driver Harris Co.
D7	Dickson Weatherproof Nail Co.
E1	Eastern Gas&Fuel Assoc.
E2	Eastern Stainless Steel
E4	Electro Metallurgical Co.
E5	Elliott Bros. Steel Co.
E6	Empire Steel Corp.
F2	Firth Sterling Steel
F3	Fitzsimons Steel Co.
F4	Follansbee Steel Corp.
F5	Franklin Steel Div. Borg-Warner Corp.
F6	Fretz-Moon Tube Co.
F7	Ft. Howard Steel & Wire
G2	Globe Iron Co.
G3	Globe Steel Tubes Co.
G4	Granite City Steel Co.
G5	Great Lakes Steel Corp.
G6	Greer Steel Co.
H1	Hanna Furnace Corp.
I-1	Igoe Bros. Inc.
I-2	Inland Steel Co.
I-3	Interlake Iron Corp.
I-4	Ingersoll Steel Div. Borg-Warner Corp.
J1	Jackson Iron & Steel Co.
J3	Jessop Steel Co.
J4	Johnson Steel & Wire Co.
J5	Jones & Laughlin Steel
J6	Joslyn Mfg. & Supply
J7	Judson Steel Corp.
J8	Jersey Shore Steel Co.
K1	Kaiser Steel Corp.
K2	Keokuk Electro Metals
K3	Keystone Drawn Steel
K4	Keystone Steel & Wire
L1	Laclede Steel Co.
L2	LaSalle Steel Co.
L3	Latrobe Electric Steel
L5	Lockhart Iron & Steel
L6	Lone-Star Steel Co.
L7	Lukens Steel Co.

STRIP, Cold-Rolled Alloy Steel	
Bridgeprt.Conn. (10)S15	10.75
Carnegie,Pa. S18	10.60
Cleveland A7	10.00
Dover,O. G6	10.50
Fontana,Calif. K1	11.65
Harrison,N.J. C18	10.60
Midland,Pa. C18	10.60
NewBritn.Conn. (10)S15	10.75
Pawtucket,R.I. (11) N8	10.75
Pawtucket,R.I. (12) N8	11.05
Sharon,Pa. S3	10.60
Worcester,Mass. A7	10.30
Youngstown C8	10.60

STRIP, Hot-Rolled Ingot Iron	
Ashland,Ky. (8) A10	3.75
Warren,O. R2	4.10

STRIP, Cold-Rolled Ingot Iron	
Warren,O. R2	5.25

TIGHT COOPERAGE HOOP	
Atlanta A11	4.05
Riverdale,Ill. A1	3.90
Sharon,Pa. S3	4.15
Youngstown U5	3.75

WIRE, Merchant Quality (6 to 8 gage)	An'ld	Galv
AlabamaCity R2	5.70	5.95
Aliquippa J5	5.70	6.15
Atlanta A11	5.95	6.40
Bartonville(19)K4	5.70	6.15
Buffalo W12	4.85	
Cleveland A7	5.70	6.15
Crawfordsville M8	5.95	6.40
Donora,Pa. A7	5.70	6.15
Duluth,Minn. A7	5.70	6.15
Fairfield T2	5.70	6.15
Houston,Tex. S5	6.10	6.55
Johnstown B2	5.70	6.15
Joliet,Ill. A7	5.70	6.15
KansasC'y,Mo. S5	6.30	6.75
Kokomo C16	5.80	6.05
LosAngeles B3	6.65	
Minnequa C10	5.95	4.45
Monessen P7	5.95	6.40
Palmer W12	5.15	
Pitts.,Calif. C11	6.65	6.80
Prtsmth. (18)P12	6.10	6.60
Rankin A7	5.70	6.15
So.Chicago R2	5.70	5.95
So.S.Fran. C10	6.65	7.10
SparrowsPt. B2	5.80	6.25
Sterling,Ill. (1)N15	5.70	6.15
Struthers,O. Y1	5.70	6.15
Torrance,Cal. C11	6.65	
Worcester A7	6.00	6.45

ROPE WIRE	(A)	(B)
Alton,Ill. L1	8.65	8.90
Bartonville,Ill. K4	8.55	8.80
Buffalo W12	8.55	8.80
Fostoria,O. S1	8.85	9.10
Johnstown,Pa. B2	8.55	8.80
Monessen,Pa. P16	8.55	8.80
Monessen,Pa. P7	8.80	9.05
Palmer,Mass.W12	8.85	9.10
Portsmouth,O. P12	8.55	8.80
Roebling,N.J. R5	8.85	9.10
SparrowsPt. B2	8.65	8.90
Struthers,O. Y1	8.55	8.80
Worcester J4, T6	8.85	9.10

(A) Plow and Mild Plow.
(B) Improved Plow.

WIRE, Manufacturers Bright, Low Carbon	
AlabamaCity,Ala. R2	4.85
Aliquippa,Pa. J5	4.85
Atlanta A11	5.10
Alton,Ill. L1	5.05
Bartonville,Ill. (1) K4	4.85
Buffalo W12	4.85
Chicago W13	5.10
Cleveland A7, C20	4.85
Crawfordsville,Ind. M8	5.10
Donora,Pa. A7	4.85
Duluth,Minn. A7	4.85
Fairfield,Ala. T2	4.85
Fostoria,O. (24) S1	5.35
Houston S5	5.25
Johnstown,Pa. B2	4.85
Joliet,Ill. A7	4.85
KansasCity,Mo. S5	5.45
Kokomo,Ind. C16	4.95
LosAngeles B3	5.80
Minnequa,Colo. C10	5.10
Monessen,Pa. P7	5.10
Newark, 6-8 ga. I-1	5.50
No.Tonawanda B11	4.85
Palmer,Mass. W12	5.15
Pittsburg,Calif. C11	5.80
Portsmouth,O. P12	5.25
Rankin,Pa. A7	4.85
So.Chicago,Ill. R2	4.85
So.SanFrancisco C10	5.80
SparrowsPoint,Md. B2	4.95
Sterling,Ill. (1) N15	4.85
Struthers,O. Y1	4.85
Torrance,Calif. C11	5.80
Waukegan,Ill. A7	4.85
Worcester,Mass. A7, T6	5.15

WIRE, Cold-Rolled Flat	
Anderson,Ind. G6	6.20
Buffalo W12	6.35
Cleveland A7	5.85
Crawfordsville,Ind. M8	6.20
Detroit D2	6.20
Dover,O. G6	6.20
Fostoria,O. S1	6.00
Kokomo,Ind. C16	5.70
FranklinPark,Ill. T6	6.20
Massillon,O. R8	5.85
Monessen,Pa. P16	5.85
Monessen,Pa. P7	6.10
NewHaven,Conn. D2	6.50
Pawtucket,R.I. (12) N8	6.85
Trenton,N.J. R5	6.15
Worcester,Mass. A7	6.15
Worcester,Mass. T6	6.30
Worcester,Mass. W12	6.65

WIRE, Galv'd ACSR for Cores	
Bartonville,Ill. K4	8.50
Monessen,Pa. P16	8.50
Roebling,N.J. R5	8.80
SparrowsPoint,Md. B2	8.60
Johnstown,Pa. B2	8.50

WIRE, Tire Bead	
Bartonville,Ill. (1) K4	10.90
Monessen,Pa. P16	11.40
Roebling,N.J. R5	11.55

WIRE (16 gage)	An'ld Stone	Galv. Stone
Aliquippa J5	10.15	12.15
Bartonville(1)K4	10.25	11.95
Cleveland A7	10.25	12.15
Crawfrdsville M8	10.30	12.00
Fostoria,O. S1	10.40	13.00
Johnstown B2	10.25	12.15
Kokomo C16	10.25	11.95
Minnequa C10	10.40	12.40
Palmer,Mass.W12	10.25	12.15
Pitts.Cal. C11	10.60	12.50
Prtsmth. (18) P12	10.55	12.30
SparrowsPt. B2	10.35	12.25
Waukegan A7	10.25	12.15

WIRE, MB Spring, High Carbon	
Aliquippa,Pa. J5	6.25
Alton,Ill. L1	6.45
Bartonville,Ill. (1) K4	6.25
Buffalo W12	6.25
Cleveland A7	6.25
Donora,Pa. A7	6.25
Duluth,Minn. A7	6.25
Fostoria,O. S1	6.25
Johnstown,Pa. B2	6.25
LosAngeles B3	7.20
Milbury,Mass. (12) N6	8.05
Monessen,Pa. P7, P16	6.25
Palmer,Mass. W12	6.55
Pittsburg,Calif. C11	7.20
Roebling,N.J. R5	6.55
Portsmouth,O. P12	6.25
So.Chicago,Ill. R2	6.25
So.SanFrancisco C10	7.20
SparrowsPoint,Md. B2	6.35
Struthers,O. Y1	6.25
Trenton,N.J. A7	6.55
Waukegan,Ill. A7	6.25
Worcester A7, T6, W12	6.55
Worcester,Mass. J4	6.75

WIRE, Fine & Weaving(8" Coils)	
Bartonville,Ill. (1) K4	8.90
Buffalo W12	8.90
Chicago W13	8.90
Cleveland A7	8.90
Crawfordsville,Ind. M8	8.95
Fostoria,O. S1	8.90
Johnstown,Pa. B2	8.90
Kokomo,Ind. C16	8.90
Monessen,Pa. P16	8.90
Palmer,Mass. W12	9.20
Portsmouth,O. P12	8.90
Roebling,N.J. R5	9.20
Waukegan,Ill. A7	8.90
Worcester,Mass. A7, T6	9.20

WIRE, Barbed	Col.
AlabamaCity,Ala. R2	137
Aliquippa,Pa. J5	141
Atlanta A11	144
Bartonville,Ill. (19) K4	144
Crawfordsville,Ind. M8	146
Donora,Pa. A7	141
Duluth,Minn. A7	141
Fairfield,Ala. T2	141
Houston,Tex. S5	149
Johnstown,Pa. B2	141
Joliet,Ill. A7	141
KansasCity,Mo. S5	153
Kokomo,Ind. C16	143
Minnequa,Colo. C10	147
Monessen,Pa. P7	146
Pittsburg,Calif. C11	161
Portsmouth,O. (18) P12	148
Rankin,Pa. A7	141
So.Chicago,Ill. R2	137
So.SanFran.,Calif. C10	161
SparrowsPoint,Md. B2	143
Sterling,Ill. (1) N15	141

BALE TIES, Single Loop	Col.
AlabamaCity,Ala. R2	123
Atlanta A11	126
Bartonville,Ill. (19) K4	123
Crawfordsville,Ind. M8	132
Donora,Pa. A7	123
Duluth,Minn. A7	123
Fairfield,Ala. T2	123
Joliet,Ill. A7	123
KansasCity,Mo. S5	135
Kokomo,Ind. C16	125
Minnequa,Colo. C10	128
Pittsburg,Calif. C11	147
So.Chicago,Ill. R2	123
So.SanFran.,Calif. C10	147
SparrowsPoint,Md. B2	125
Sterling,Ill. (1) N15	123

WIRE, Upholstery Spring	
Aliquippa,Pa. J5	5.90
Alton,Ill. L1	6.10
Buffalo W12	5.90
Cleveland A7	5.90
Donora,Pa. A7	5.90
Duluth,Minn. A7	5.90
Johnstown,Pa. B2	5.90
LosAngeles B3	6.85
Monessen,Pa. P7, P16	5.90
NewHaven,Conn. A7	6.20
Palmer,Mass. W12	6.20
Pittsburg,Calif. C11	6.85
Portsmouth,O. P12	5.90
Roebling,N.J. R5	6.20
So.Chicago,Ill. R2	5.90
So.SanFrancisco C10	6.85
SparrowsPoint,Md. B2	6.00
Torrance,Calif. C11	6.85
Trenton,N.J. A7	6.20
Waukegan,Ill. A7	5.90
Worcester,Mass. A7	6.20

WOVEN FENCE, 9-15½ Ga.	Col.
AlabamaCity,Ala. R2	127
Ala.City,Ala. 17-18ga.R2	214
Aliquippa,Pa.9-14½ga.J5	131
Atlanta A11	134
Bartonville,Ill. (19) K4	131
Crawfordsville,Ind. M8	133
Donora,Pa. A7	131
Duluth,Minn. A7	131
Fairfield,Ala. T2	131
Houston,Tex. S5	139
Johnstown,Pa. B2	131
Johnstown,17ga. 6" B2	205
Johnstown,17ga. 4" B2	208
Joliet,Ill. A7	131
KansasCity,Mo. S5	143
Kokomo,Ind. C16	133
Minnequa,Colo. C10	139
Monessen,Pa. P7	136
Pittsburg,Calif. C11	154
Portsmouth,O. (18) P12	138
Rankin,Pa. A7	131
So.Chicago,Ill. R2	127
Sterling,Ill. (1) N15	131

FENCE POSTS	
ChicagoHts.,Ill. C2	140
Duluth,Minn. A7	125
Franklin,Pa. F5	140
Huntington,W.Va. W7	140
Johnstown,Pa. B2	140
Marion,O. P11	140
Minnequa,Colo. C10	130
Moline,Ill. R2	136
So.Chicago,Ill. R2	140
Tonawanda,N.Y. B12	140
Williamsport,Pa. S19	150

TRACK BOLTS (20) Treated	
KansasCity,Mo. S5	9.85
Lebanon,Pa. (31) B2	9.85
Minnequa,Colo. C10	9.85
Pittsburgh O3, P14	9.85
Seattle B3	10.35

NAILS & STAPLES, Stock to dealers & mfrs. (7)	Col.
AlabamaCity,Ala. R2	118
Aliquippa,Pa. (13) J5	118
Atlanta A11	121
Bartonville,Ill. (19) K4	118
Chicago,Ill. W13	118
Cleveland A9	125
Crawfordsville,Ind. M8	122
Donora,Pa. A7	118
Duluth,Minn. A7	118
Fairfield,Ala. T2	118
Galveston,Tex. D7	126
Houston, Tex. S5	126
Johnstown,Pa. B2	118
Joliet,Ill. A7	118
KansasCity,Mo. S5	130
Kokomo,Ind. C16	120
Minnequa,Colo. C10	123
Monessen,Pa. P7	124
Pittsburg,Calif. C11	137
Portsmouth,O. P12	124
Rankin,Pa. A7	118
So.Chicago,Ill. R2	118
SparrowsPoint,Md. B2	120
Sterling,Ill. (1) N15	118
Torrance,Calif. C11	138
Worcester,Mass. A7	124

NAILS, Cut (100 lb keg) To dealers (33)	
Conshohocken,Pa. A3	$7.35
Wheeling,W.Va. 10	7.35

TIE PLATES	
Fairfield,Ala. T2	4.50
Gary,Ind. U5	4.50
Ind.Harbor,Ind. I-2	4.50
Lackawanna,N.Y. B2	4.50
Minnequa,Colo. C10	4.50
Pittsburg,Calif. C11	4.65
Seattle B3	4.65
Steelton,Pa. B2	4.50
Torrance,Calif. C11	4.65

JOINT BARS	
Bessemer,Pa. U5	4.70
Fairfield,Ala. T2	4.70
Ind.Harbor,Ind. I-2	4.70
Joliet,Ill. U5	4.70
Lackawanna,N.Y. B2	4.70
Minnequa,Colo. C10	4.70
Steelton,Pa. B2	4.70

STANDARD TRACK SPIKES	
Ind.Harbor,Ind. I-2, Y1	6.15
KansasCity,Mo. S5	6.40
Lebanon,Pa. B2	6.15
Minnequa,Colo. C10	6.15
Pittsburgh J5	6.15
Seattle B3	6.65
So.Chicago,Ill. R2	6.15
Struthers,O. Y1	6.15
Youngstown R2	6.15

AXLES	
Ind.Harbor,Ind. S13	5.60
Johnstown,Pa. B2	5.60

RAILS	Std. No. 1.	Std. No. 2	Std. All No. 2	Tee Rails 60 lb Under
Bessemer,Pa. U5	3.60	3.50	3.55	4.00
Ensley,Ala. T2	3.60	3.50	...	4.00
Fairfield,Ala. T2	...			4.00
Gary,Ind. U5	3.60	3.50	3.55	...
Huntington,W.Va. W7	...	...	...	5.00
Ind.Harbor,Ind. I-2	3.60	3.50	3.55	...
Johnstown,Pa. B2	...	...	...	(16)4.00
Lackawanna,N.Y. B2	3.60	3.50	...	4.00
Minnequa,Colo. C10	3.60	3.50	...	4.50
Steelton,Pa. B2	3.60	3.50	...	...
Williamsport,Pa. S19				4.75

Key to Producers

M1	McLouth Steel Corp.
M4	Mahoning Valley Steel
M5	Medart Co.
M6	Mercer Tube & Mfg. Co.
M8	Mid-States Steel & Wire
M9	Midvale Co.
M12	Moltrup Steel Products
M13	Monarch Steel Co.
M14	McInnes Steel Co.
N2	National Supply Co.
N3	National Tube Div.
N5	Nelsen Steel & Wire Co.
N6	NewEng-HighCarb. Wire
N8	Newman-Crosby Steel
N12	Niles Rolling Mill Co.
N14	Nrthwst.Steel Roll. Mills
N15	Northwestern S.&W. Co.
N16	New Delphos Mfg. Co.
O3	Oliver Iron & Steel Corp.
O4	Oregon Steel Mills
P1	Pacific States Steel Corp.
P2	Pacific Tube Co.
P4	Phoenix Iron & Steel Co.
P5	Pilgrim Drawn Steel
P6	Pittsburgh Coke & Chem.
P7	Pittsburgh Steel Co.
P9	Pittsburgh Tube Co.
P11	Pollak Steel Co.
P12	Portsmouth Division, Detroit Steel Corp.
P13	Precision Drawn Steel
P14	Pitts. Screw & Bolt Co.
P15	Pittsburgh Metallurgical
P16	Page Steel & Wire Div., Amer. Chain & Cable
P17	Plymouth Steel Co.
R1	Reeves Steel & Mfg. Co.
R2	Republic Steel Corp.
R3	Rhode Island Steel Corp.
R5	Roebling's Sons, John A.
R6	Rome Strip Steel Co.
R7	Rotary Electric Steel Co.
R8	RelianceDiv.,Eaton Mfg.
S1	Seneca Wire & Mfg. Co.
S3	Sharon Steel Corp.
S5	Sheffield Steel Corp.
S6	Shenango Furnace Co.
S7	Simmons Co.
S8	Simonds Saw & Steel Co.
S9	Sloss-Sheffield S.&I. Co.
S13	Standard Forgings Corp.
S14	Standard Tube Co.
S15	Stanley Works
S16	Struthers Iron & Steel
S17	Superior Drawn Steel Co.
S18	Superior Steel Corp.
S19	Sweet's Steel Co.
S20	Southern States Steel
T2	Tenn. Coal & Iron Div.
T3	Tenn. Prod. & Chem.
T4	Texas Steel Co.
T5	Thomas Steel Co.
T6	Thompson Wire Co.
T7	Timken Roller Bearing
T9	Tonawanda Iron Div. Am. Rad. & Stan. San.
U1	Ulster Iron Works
U4	Universal Cyclops Steel
U5	United States Steel Co.
V2	Vanadium-Alloys Steel
V3	Vulcan Crucible Steel Co.
W1	Wallace Barnes Co.
W2	Wallingford Steel Co.
W3	Washburn Wire Co.
W4	Washington Steel Corp.
W6	Weirton Steel Co.
W7	W. Va. Steel & Mfg. Co.
W8	West.Auto.Mach.Screw
W9	Wheatland Tube Co.
W10	Wheeling Steel Corp.
W12	Wickwire Spencer Steel Div., Colo. Fuel & Iron
W13	Wilson Steel & Wire Co.
W14	Wisconsin Steel Div. International Harvester
W15	Woodward Iron Co.
W18	Wyckoff Steel Co.
Y1	YoungstownSheet&Tube

TOOL STEEL

Grade	$ per lb
Regular Carbon	0.230
Extra Carbon	0.270
Special Carbon	0.325
Oil Hardening	0.350
5% Cr Hot Work	0.350
Hi-Carbon-Cr	0.635

Grade by Analysis

W	Cr	V	Co	
18	4	1		1.505
18	4	2		1.650
20.25	4.25	1.6	12.25	3.535-3.675
19	4	2	7	2.460
18.25	4.25	1	4.75	2.125
18	4	2	9	2.445-2.45
13.5	4	3	....	1.6025

W	Cr	V	Mo	
6.4	4.5	1.9	5	0.96-0.965
6	4	3	6	1.190
1.5	4	1	8.5	0.810

Tool steel producers include: A4, A8, B2, B8, C4, C9, C13, C18, D4, F2, J3, L3, M14, S8, U4, V2 and V3.

Footnotes:

(1) Chicago base.
(2) Angles, flats, bands.
(3) Merchant.
(4) Reinforcing.
(5) Philadelphia del.
(6) Chicago or Birm. base.
(7) To jobbers, 3 cols. lower.
(8) 16 gage and heavier.
(9) 6 in. and narrower.
(10) Pittsburgh base.
(11) Cleveland & Pitts. base.
(12) Worcester, Mass. base.
(13) Add 0.50c for 17 Ga. & heavier.
(14) Also wide flange beams.
(15) ½" and thinner.
(16) 40 lb and under.
(17) Flats only.
(18) To dealers.
(19) Chicago & Pitts. base.
(20) 0.25c off for untreated.
(21) New Haven, Conn. base.
(22) Del. San Francisco Bay area.
(23) 28 Ga. 36" wide.
(24) Deduct 0.20c, finer than 15 Ga.
(25) Bar mill bands.
(26) Reinforcing, mill lengths, to fabricators; to consumers, 5.60c.
(27) Bar mill sizes.
(28) Bonderized.
(29) Subject to 10% increase.
(30) Sheared; add 0.35c for universal mill.
(31) Not annealed.
(32) Rd. or square edge.
(33) To jobbers, deduct 20c.
(34) 7.25c for cut lengths.
(35) 72" and narrower.
(36) 54" and narrower.
(37) 15 gage & lighter; 60" & narrower.
(38) 14 gage & lighter; 48" & narrower.
(39) 48" and narrower.
(40) Lighter than 0.035"; 0.035" and heavier, 0.25c higher.

CEILING PRICES, IRON AND STEEL SCRAP

Prices as set forth in Office of Price Stabilization ceiling price regulation No. 5, as amended Oct. 23, 1951

STEELMAKING SCRAP COMPOSITE

Jan. 3	$43.00
Dec. 27	43.00
Dec. 1951	43.00
Jan. 1951	46.33
Jan. 1947	31.20

* Based on No. 1 heavy melting grade at Pittsburgh, Chicago and eastern Pennsylvania.

Basing point ceiling prices per gross ton from which maximum shipping prices are computed on scrap of dealer and industrial origin, and from which ceiling on-line and ceiling delivered prices are computed on scrap of railroad origin.

Grade 1 **Basing Point**	**No. 1 Bundles Dealer, Industrial**	**No. 1 Heavy Melt Railroad**
Alabama City, Ala.	$39.00	$41.00
Ashland, Ky.	42.00	44.00
Atlanta, Ga.	39.00	41.00
Bethlehem, Pa.	42.00	44.00
Birmingham, Ala.	39.00	41.00
Brackenridge, Pa.	44.00	46.00
Buffalo, N. Y.	43.00	45.00
Butler, Pa.	44.00	46.00
Canton, O.	44.00	46.00
Chicago, Ill.	42.50	44.50
Cincinnati, O.	43.00	45.00
Claymont, Del.	42.50	44.50
Cleveland, O.	43.00	45.00
Coatesville, Pa.	42.50	44.50
Conshohocken, Pa.	42.50	44.50
Detroit, Mich.	41.15	43.15
Duluth, Minn.	40.00	42.00
Harrisburg, Pa.	42.50	44.50
Houston, Tex.	37.00	39.00
Johnstown, Pa.	44.00	46.00
Kansas City, Mo.	39.50	41.50
Kokomo, Ind.	42.00	44.00
Los Angeles	35.00	37.00
Middletown, O.	43.00	45.00
Midland, Pa.	44.00	46.00
Minnequa, Colo.	38.00	40.00
Monessen, Pa.	44.00	46.00
Phoenixville, Pa.	42.50	44.50
Pittsburg, Calif.	35.00	37.00
Pittsburgh, Pa.	44.00	46.00
Portland, Oreg.	35.00	37.00
Portsmouth, O.	42.00	44.00
St. Louis, Mo.	41.00	43.00
San Francisco	35.00	37.00
Seattle, Wash.	35.00	37.00
Sharon, Pa.	44.00	46.00
Sparrows Pt., Md.	42.00	44.00
Steubenville, O.	44.00	46.00
Warren, O.	44.00	46.00
Weirton, W. Va.	44.00	46.00
Youngstown, O.	44.00	46.00

Differentials from Base

Differentials per gross ton for other grades of dealer and industrial scrap.

	O-H and Blast Furnace Grades	
2	No. 1 Busheling	Base
3	No. 1 Heavy Melting	$1.00
4	No. 2 Heavy Melting	1.00
5	No. 2 Bundles	1.00
6	Machine Shop Turnings	10.00
7	Mixed Boring & Short Turnings	6.00
8	Shoveling Turnings	6.00
9	No. 2 Busheling	4.00
10	Cast Iron Borings	6.00
	Elec. Furnace and Fdry. Grades	
11	Billet, Bloom & Forge Crops	+ 7.50
12	Bar Crops & Plate	+ 5.00
13	Cast Steel	+ 5.00
14	Punchings & Plate Scrap	+ 2.50
15	Electric Furnace Bundles	+ 2.00
	Cut Structurals & Plate:	
16	3 feet and under	+ 3.00
17	2 feet and under	+ 5.00
18	1 foot and under	+ 6.00
19	Briquetted Cast Iron Borings	Base
	Foundry Steel:	
20	2 feet and under	Base
21	1 foot and under	+ 2.00
22	Springs and Crankshafts	+ 1.00
23	Alloy Free Turnings	3.00
24	Heavy Turnings	1.00
25	Briquetted Turnings	Base
26	No. 1 Chemical Borings	— 3.00
27	No. 2 Chemical Borings	4.00
28	Wrought Iron	+ 10.00
29	Shafting	+ 10.00
30	Hard Steel cut 2 ft & under	+ 3.00
31	Old Tin & Terne Plated Bundles	—10.00

Unprepared Grades

When compressed constitutes

32	No. 1 Bundles	6.00
33	No. 2 Bundles	9.00
34	Other than material suitable for hydraulic compression	— 8.00

Restrictions on Use

(1) Prices for Grades 11 and 23 may be charged only when shipped to a consumer directly from an industrial producer, otherwise ceiling prices shall not exceed prices established for Grades 12 and 8, respectively.

(2) Prices established for Grades 26 and 27 may be charged only when sold for use for chemical or annealing purposes, and in the case of Grade 27, for briquetting and direct charge into an electric furnace, otherwise ceiling prices shall not exceed price established for Grade 10.

(3) Prices established for Grade 28 may be charged only when sold to a producer of wrought iron; otherwise ceiling price shall not exceed ceiling price for corresponding grade of basic open-hearth.

(4) Premiums for Grades 11-18, 20 and 21 may be charged only upon OPS authorization or when sold for use in electric and open-hearth furnaces or foundries.

(5) Prices for Grade 29 may be charged only when sold for forging or rerolling purpose.

(6) Prices for Grade 30 may be charged only when sold upon OPS authorization to a gray iron foundry; otherwise price for Grade 20 will prevail.

Special Pricing Provisions

(1) Sellers of Grades 26 and 27 may make an extra charge of $1.50 per ton for loading in box cars, or 75 cents per ton for covering gondola cars with a weather-resistant covering.

(2) Ceiling price of pit scrap, ladle scrap, salamander scrap, skulls, skimmings or scrap recovered from slag dumps and prepared to charging box size shall be computed by deducting from the price of No. 1 heavy melting steel of dealer and industrial origin the following amounts: Where iron content is 85% and over, $6; 75% and over, $10; less than 75%, $12.

(3) Ceiling price of any inferior grade of scrap not listed shall not exceed the price of No. 1 bundles less $15.00.

Differentials from Base

Differentials per gross ton above or below the price of Grade 1 (No. 1 railroad heavy melting steel) for other grades of railroad steel scrap:

2	No. 2 Heavy Melting Steel	— $2.00
3	No. 2 Steel Wheel	Base
4	Hollow Bored Axles and loco. axles with keyways between the wheelseats	Base
5	No. 1 Busheling	— 3.50
6	No. 1 Turnings	— 3.00
7	No. 2 Turnings, Drillings & Borings	—12.00
8	No. 2 Cast Steel and uncut wheelcenters	— 6.00
9	Uncut Frogs, Switches	Base
10	Flues, Tubes & Pipes	— 8.00
11	Structural Wrought Iron and/or steel, uncut	— 6.00
12	Destroyed Steel Cars	— 8.00
13	No. 1 Sheet Scrap	— 9.50
14	Scrap Rails, Random Lengths	+ 2.00
15	Rerolling Rails	+ 7.00
	Cut Rails:	
16	3 feet and under	+ 5.00
17	2 feet and under	+ 6.00
18	18 inches and under	+ 8.00
19	Cast Steel, No. 1	+ 3.00
20	Uncut Tires	+ 2.00
21	Cut Tires	+ 5.00
	Bolsters & Side Frames:	
22	Uncut	Base
23	Cut	+ 3.00
24	Angles, Splice Bars & Tie Plates	+ 5.00
25	Solid Steel Axles	+ 12.00
26	Steel Wheels, No. 3 oversize	Base
27	Steel Wheels, No. 3	+ 5.00
28	Spring Steel	+ 5.00
29	Couplers & Knuckles	+ 5.00
30	Wrought Iron	+ 8.00
31	Fireboxes	— 8.00
32	Boilers	— 6.00
33	No. 2 Sheet Scrap	—13.00
34	Carsides, Doors, Car Ends, cut apart	— 6.00
35	Unassorted Iron & Steel	— 6.00
36	Unprepared scrap, not suitable for hydraulic compression	— 8.00

Restrictions on Use

(1) Price established for Grade 15 may be charged only when purchased and sold for rerolling uses, otherwise, ceiling shall not exceed that for Grade 14.

(2) Price established for Grade 30 may be charged only when sold to a producer of wrought iron; otherwise ceiling shall not exceed that for No. 1 heavy melting steel.

(3) Price for Grade 25 may be charged only when sold for rerolling and forging purposes, otherwise ceiling shall not exceed that for base grade (No. 1).

CAST IRON SCRAP

Ceiling price per gross ton for following grades shall be f.o.b. shipping point.

	Cast Iron:	
1	No. 1 (Cupola)	$49.00
2	No. 2 (Charging Box)	47.00
3	No. 3 (Hvy. Breakable)	45.00
4	No. 4 (Burnt Cast)	41.00
5	Cast Iron Brake Shoes	41.00
6	Stove Plate	46.00
7	Clean Auto Cast	52.00
8	Unstripped Motor Blocks	43.00
9	Wheels, No. 1	47.00
10	Malleable	55.00
11	Drop Broken Machinery	52.00

Restrictions on Use

(1) Ceiling shipping point price which a basic open-hearth consumer may pay for No. 1 cast iron, clean auto cast, malleable or drop broken machinery cast shall be ceiling price for No. 2 charging box cast.

(2) Ceiling shipping point price which any foundry other than a malleable iron producer may pay for Grade 10 shall be ceiling price for No. 1 cast iron.

Preparation Charges

Ceiling fees per gross ton which may be charged for intransit preparation of any grade of steel scrap of dealer or industrial origin authorized by OPS are:

(1) For preparing into Grades No. 3, No. 4 or No. 2, $8.
(2) For hydraulically compressing Grade No. 1, $6 per ton; Grade No. 5, $8.
(3) For crushing Grade No. 6, $3.
For preparing into:
(4) Grade No. 25, $6.
(5) Grade No. 19, $6.
(6) Grades No. 12, No. 13, No. 14, No. 16, or No. 20, $10.
(7) Grade No. 17 or No. 21, $11.
(8) Grade No. 18, $12.
(9) For hydraulically compressing Grade No. 15, $8.
(10) For preparing into Grade No. 28, $10.

Ceiling fees per gross ton which may be charged for intransit preparation of any grade of steel scrap of railroad origin shall be:

(1) For preparing into Grade No. 1 and Grade No. 2, $8.
(2) For hydraulically compressing Grade No. 13, $6.
For preparing into:
(3) Grade No. 16, $4.
(4) Grade No. 17, $5.
(5) Grade No. 18, $7.
(6) Grade No. 21, $4.
(7) Grade No. 23, $4.

Ceiling fees per gross ton which may be charged for intransit preparation of cast iron are limited to:

(1) For preparing Grade No. 8 into grade No. 7, $9.
(2) For preparing Grade No. 3 into Grade No. 11, $7.
(3) For preparing Grade No. 3 into Grade No. 1, $4.

Whenever scrap has arrived at its point of delivery and consumer engages a dealer to prepare such scrap, no fee may be charged for such services unless consumer obtains prior written OPS approval.

Commissions

No commission shall be payable to a broker in excess of $1.

Premiums for Alloy Content

No premium may be charged for alloy content except: $1.25 per ton for each 0.25% of nickel where scrap contains not less than 1% and not over 5.25% nickel; $2 per ton for scrap containing not less than 0.15 per cent molybdenum and $3 for scrap containing not less than 0.65% molybdenum; for scrap containing not less than 10% manganese, $4 for scrap in sizes larger than 12 x 24 x 8 in., and $14 for scrap cut in that size or smaller (applicable only if scrap is sold for electric furnace uses or on NPA allocation); $1 for scrap conforming to SAE 52100.

Switching Charges

Switching charges to be deducted from basing point prices of dealer, industrial and nonoperating railroad scrap, to determine ceiling shipping point prices for scrap originating in basing points are per gross ton:

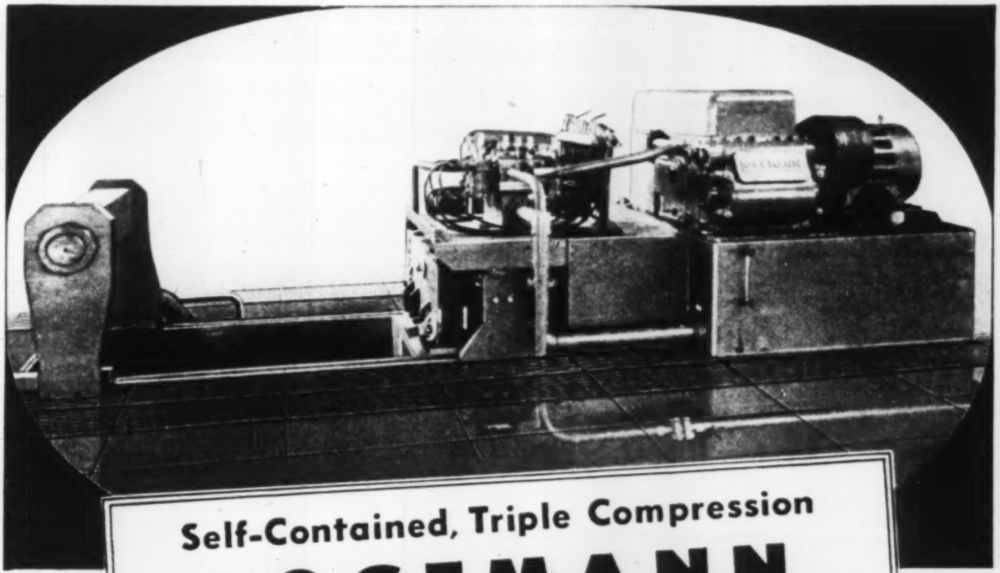
Alabama City, Ala., 43c; Ashland, Ky., 47c; Atlanta, 51c.
Bethlehem, Pa., 52c; Birmingham, 50c; Brackenridge, Pa., 53c; Buffalo, 83c; Butler, Pa., 65c.
Canton, O., 51c; Chicago (including Gary, Ind.), $1.34; Cincinnati (including Newport, Ky.), 65c; Claymont, Del. (including Chester, Pa.), 79c; Cleveland, 76c.
Coatesville, Pa., 50c; Conshohocken, Pa., 20c.
Detroit, 95c; Duluth, Minn., 50c.
Harrisburg, Pa., 51c; Houston, 57c.
Johnstown, Pa., 75c.
Kansas City, Mo., 78c; Kokomo, Ind., 51c.
Middletown, O., 26c; Midland, Pa., 75c; Minnequa, Colo., 33c; Monessen, Pa., 51c.
Phoenixville, Pa., 51c; Pittsburg, Calif., 65c; Pittsburgh (including Bessemer, Homestead, Duquesne, Munhall), 99c; Portland, Oreg., 52c; Portsmouth, O., 51c.
St. Louis (including Federal, Granite City, E. St. Louis, Madison, Ill.), 51c; San Francisco (including So. San Francisco, Niles, Oakland), 66c; Seattle, 59c; Sharon, Pa., 75c; Sparrows Point, Md., 20c; Steubenville, O., 51c.
Warren, Pa., 75c; Weirton, 70c.
Youngstown, 75c.

HAMILTON, ONT.

(Delivered Prices)

Heavy Melt	$35.00
No. 1 Bundles	35.00
No. 2 Bundles	35.00
Mechanical Bundles	31.50
Mixed Steel Scrap	31.00
Mixed Borings, Turnings	32.00
Rails, Remelting	35.00
Rails, Rerolling	38.00
Busheling	29.50
Bushelings new factory:	
Prep'd	33.00
Unprep'd	31.00
Short Steel Turnings	32.00
Cast Iron Grades*	
No. 1 Machinery Cast	55.00

* F.o.b. shipping point.



Self-Contained, Triple Compression

LOGEMANN SCRAP PRESSES

. . . give you compact, high density bales . . . at low cost!

LOGEMANN

Also specializes in

WASTE PAPER BALERS

for Industrial Applications

and in

HIGH PRESSURE PUMPS

. . . for pressures from 2000 to 50,000 p.s.i. for press operation, hydrostatic tests, and similar applications.

You Conserve Floor Space and Piping with this Compact Installation

Here is a combination of tried and tested units expertly assembled to reduce floor space requirements to a minimum. Features include a big box, high speed operation, and high density bales. Various box sizes are available to meet maximum scrap and minimum bale dimensions.

Also available are various sizes and types of pumps and operating valves to meet output requirements. Logemann Scrap Presses can be equipped with loading hopper in which the scrap charge can be prepared while the press is going through the operations on the preceding bale. Compressed bales are delivered at floor level for ejection to conveyor, steel chute, or into accumulation pit.

Write for Complete Details

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3164 W. BURLEIGH STREET • MILWAUKEE 10, WISCONSIN

SLAB
ZINC

every grade of ZINC
for urgent military and
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PRIME WESTERN
SELECT
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INTERMEDIATE
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SPECIAL HIGH GRADE

AMERICAN ZINC SALES COMPANY

Distributors for

AMERICAN ZINC, LEAD & SMELTING COMPANY

Columbus, O. Chicago St. Louis New York

STANDARD PIPE, T. & C.

BUTTWELD — Carload Discounts from List, %

Size Inches	List Per Ft	Pounds Per Ft	Black A	Black B	Black C	Galvanized D	Galvanized E	Galvanized F
⅛	5.5c	0.24	34.0	32.0	...	+0.5	+2.5	...
¼	6.0	0.42	28.5	26.5	...	+3.5	+5.5	...
⅜	6.0	0.57	23.5	21.5	...	+10.0	+12.0	
½	8.5	0.85	36.0	34.0	35.0	12.0	10.0	11.0
¾	11.5	1.18	39.0	37.0	38.0	16.0	14.0	15.0
1	17.0	1.68	41.5	39.5	40.5	19.5	17.5	18.5
1¼	23.0	2.28	42.0	44.0	41.0	20.5	22.5	19.5
1½	27.5	2.78	42.5	41.5	41.5	21.5	20.0	20.5
2	37	3.68	43.0	41.0	42.0	22.0	20.0	21.0
2½	58.5	5.82	43.5	41.5	42.5	23.0	21.0	22.0
3	76.5	7.62	43.5	41.5	42.5	23.0	21.0	22.0

Column A: Etna, Pa. N2 and 36½% on 3½", 4"; Butler, Pa. ⅛-⅜", F6; Benwood, W. Va., 3½ points lower on ⅛", 1½ points lower on ¼", and 2 points lower on ⅜", W10; Sharon, Pa. M6, 1 point higher on ⅛", 2 points lower on ¼" and ⅜". Wheatland, Pa. W9, 2 points lower on ⅛", ¼", ⅜"; Following make ½" and larger: Lorain, O. N3; Youngstown R2 and 36¼% on 3½" and 4"; Youngstown Y1; Aliquippa, Pa. J5; Fontana, Calif. K1 quotes 11½ points lower on ½" and larger continuous weld and 24% on 3½" and 4".

Columns B & E: Sparrows Point, Md. B2.

Columns C & F: Indiana Harbor, Ind., Y1; Alton, Ill. (Gary base) 2 points lower discount L1.

Column D: Butler, Pa. F6, ⅛-⅜"; Benwood, W. Va. W10, except plus 4% on ⅛", plus 6% on ¼", plus 13% on ⅜" and 15.5% on 3½", 4"; Sharon, Pa. M6, plus 2.5 on ⅛", 1 point lower on ½", ¾", 1½ points lower on 1" and 1¼", 2 points lower on 1½", 2", 2½" and 3". Wheatland, Pa. W9, add 2 points on ⅛", ¼", ⅜", 1 point lower on ¾", 2 points lower on 1", 1½", 2", 1½ points lower on 1¼", 2½", 3". Etna, Pa. N2 and 15.5% on 3½", 4". Following quote only on ½" and larger: Lorain, O. N3, Youngstown R2, and 15½% on 3½" and 4"; Youngstown Y1, Aliquippa, Pa. J5 quotes 1 point lower on ¾", 2 points lower on 1", 1½", 2", 1½ points lower on 1¼", 2½" and 3".

SEAMLESS AND ELECTRIC WELD — Carload Discounts from List, %

Size Inches	List Per Ft	Pounds Per Ft	Seamless Black A	Seamless Galv. B	Elec. Weld Black C	Elec. Weld Galv. D
2	37.0c	3.68	29.5	8.0	29.5	8.0
2½	58.5	5.82	32.5	11.5	32.5	11.5
3	76.5	7.62	32.5	11.5	32.5	11.5
3½	92.0	9.20	34.5	13.5	34.5	13.5
4	$1.09	10.89	34.5	13.5	34.5	13.5
5	1.48	14.81	37.0	16.0	37.0	16.0
6	1.92	19.18	37.0	16.0	37.0	16.0

Column A: Aliquippa J5, Ambridge N2, Lorain N3, Youngstown Y1.

Column B: Aliquippa J5 quotes 1½ pts lower on 2", 1 pt lower on 2½-6 in., Lorain N3; Youngstown Y1.

Columns C & D: Youngstown R2.

BOILER TUBES

Net base c.l. prices, dollars per 100 ft, mill; minimum wall thtickness, cut lengths 10 to 24 ft, inclusive.

O.D. In.	B.W. Ga.	Seamless H.R.	Seamless C.D.	Elec. Weld H.R.	Elec. Weld C.D.
1	13	13.45	16.47	15.36	15.36
1¼	13	16.09	19.71	15.61	18.19
1½	13	17.27	21.15	17.25	20.30
1¾	13	19.29	23.62	19.62	23.09
2	13	21.62	26.48	21.99	25.86
2¼	13	24.35	29.82	24.50	28.84
2¼	12	26.92	32.97	26.98	31.76
2½	12	29.65	36.32	29.57	34.76
2¾	12	32.11	39.33	31.33	36.84
3	12	34.00	41.64	32.89	38.70

CLAD STEELS

(Cents per pound)

Cladding Stainless	Plates Carbon Base 10%	Plates Carbon Base 20%	Strip Cold-Rolled Carbon Base 10%	Strip Cold-Rolled Carbon Base Both Sides	Sheets Carbon Base 10%	Sheets Carbon Base 20%	Sheets Cu Base Both Sides
302					19.75	26.24 27.50	77.00
304	25.00	29.50			24.50	27.50 27.77	77.00
309	30.50	35.00					
310	36.50	41.00					144.00
316	29.50	34.00			26.00	35.92 36.50	
317	34.50	39.00					
318	33.50	38.00					
321	26.50	31.00 32.00			23.00	33.00	111.00
347	27.50	32.00			24.00	33.50 33.83	130.00
405	21.25	27.75					
410	20.75	27.25					
Nickel	33.55	45.15	41.00	54.00			
Inconel	41.23	54.18					165.00
Monel	34.93	46.28					
Copper*			23.70†	29.65‡			

* Deoxidized. † 20.20c for hot-rolled. ‡ 26.40c for hot-rolled. Production points for carbon base products: Stainless plates, sheet, Conshohocken, Pa. A3 and New Castle, Ind. I-4; stainless-clad plates, Claymont, Del. C22, Coatesville, Pa. L7 and Washington, Pa. J3; nickel, inconel, monel-clad plates, Coatesville L7; nickel, copper-clad strip, Carnegie, Pa., S18. Production point for copper-base sheets is Carnegie, Pa. A13.

BOLTS, NUTS

CARRIAGE, MACHINE BOLTS

(F.o.b. midwestern plants, per cent off list for less than case lots to consumers)

6 in. and shorter:	
½-in. & smaller diam	15
⅝-in. & ¾-in.	18.5
⅞-in. and larger	17.5
Longer than 6 in.:	
All diams	14
Lag bolts, all diams:	
6 in. and shorter	23
over 6 in. long	21
Ribbed Necked Carriage	18.5
Blank	34
Plow	34
Step, Elevator, Tap and Sleigh Shoe	21
Tire bolts	12
Boiler & Fitting-Up bolts	31

NUTS

H.P. & C.P.	Reg.	Hvy.
Square:		
½-in. & smaller	15	15
9/16-in. & ⅝-in.	12	6.5
¾-in.-1½-in.	9	1
1⅝-in. & larger	7.5	1
H.P. Hex:		
½-in. & smaller	26	22
9/16-in. & ⅝-in.	16.5	6.5
¾-in.-1½-in.	12	2
1⅝-in. & larger	8.5	2
C.P. Hex:		
½-in. & smaller	26	22
9/16-in. & ⅝-in.	23	17.5
¾-in. & 1½-in.	19.5	12
1⅝-in. & larger	12	6.5

SEMIFINISHED NUTS

American Standard

(Per cent off list for less than case or keg quantities)

	Reg.	Hvy.
½-in. & smaller	35	28.5
9/16-in. & ⅝-in.	29.5	22
¾-in.-1½-in.	24	15
1⅝-in. & larger	13	8.5
		Light
7/16-in. & smaller		35
½-in. to ⅝-in.		28.5
¾-in. to 1½-in.		26

STEEL STOVE BOLTS

(F.o.b. plant; per cent off list in packages)

Plain finish	48 & 10
Plated finishes	31 & 10

HEXAGON CAP SCREWS

(1020 steel; packaged; per cent off list)

6 in. or shorter:	
⅝-in. & smaller	42
¾-in. through 1 in.	34
Longer than 6 in.:	
⅝-in. & smaller	26
¾-in. through 1 in.	4

SQUARE HEAD SET SCREWS

(Packaged, per cent off list)

1 in. diam. x 6 in. and shorter	38
1 in. and smaller diam. x over 6 in.	26

HEADLESS SET SCREWS

(Packaged; per cent off list)

No. 10 and smaller	35
¼-in. diam. & larger	16
N.F. thread, all diams.	10

RIVETS

F.o.b. midwestern plants

Structural ½-in., larger	7.85c
7/16-in. under	36 off

WASHERS, WROUGHT

F.o.b. shipping point, to jobbers List to list-plus-$1.

FLUORSPAR

Metallurgical grade, f.o.b. shipping point in Ill., Ky., net tons, carloads, effective CaF_2 content, 70%, $43; 60%, $40.

Imported, net ton, duty paid, metallurgical grade, $33-$45.

ELECTRODES

(Threaded, with nipples, unboxed, f.o.b. plant)

GRAPHITE

Inches Diam.	Inches Length	Cents per lb
17,18,20	60,72	17.85
8 to 16	48,60,72	17.85
7	48,60	19.57
6	48,60	20.95
CARBON		
35,40	110	8.03
30	65,84,110	8.03
24	72 to 104	8.03
17 to 20	34,90	8.03

STAINLESS STEEL

Type	Sheets	C.R. Strip	Bars Wire Structurals
301	41.00	34.00	31.25
302	41.25	36.75	31.50
303	43.25	40.25	34.00
304	43.25	38.75	33.00
309	56.00	55.00	44.75
316	57.00	59.00	49.25
321	49.25	48.25	37.00
347	53.75	52.25	41.50
410	36.50	30.50	25.75
416	37.00	37.00	26.25
420	44.00	47.00	31.25
430	39.00	31.00	26.25
501	27.50	26.00	14.25
502	28.50	27.00	15.25

Balt., Types 301-347 sheet, except 303 and 309 E2.

Brackenridge, Pa., Sheets A4 quotes slight variations on Types 301-347.

Bridgeville, Pa., bars, wire, sheets & strip U1.

Butler, Pa., sheets and strip except Types 303, 309, 416, 420, 501 & 502, A10.

Carnegie, Pa., sheets and strip except Types 303, 416, 501 & 502 and 0.25c lower on Types 302, 304, 321, 347; 0.50c lower on Types 309 and 316 S18.

Cleveland, strip A7.

Detroit, strip M1 quotes 34.00c on Type 301; 36.50c, 302; 38.50c, 304; 58.50c, 316; 52.00c, 347; 30.50c, 410; 31.00c, 430.

Dunkirk, N. Y., bars, wire A4 quotes slight variations on Types 301-347.

Duquesne, Pa., bars U5.

Fort Wayne, Ind., bars and wire, except Types 501 & 502 J6 quotes slight variations on Types 301-347.

Gary, Ind., sheets except Type 416 U5.

Harrison, N. J., strip and wire C18.

Massillon, O., all items, R2.

McKeesport, Pa., strip, Type 410; bars & wire, Types 410 through 430 and 31.25c on Type 302, 33.75c on 303, 32.75c on 304, 48.75c on 316, 36.75c on 321, 41.25c on 347 F2.

McKeesport, Pa., bars, sheets except Type 416 U5.

Middletown, O., sheets and strip except Types 303, 416, 420, 501 and 502 A10.

Midland, sheets & strip C18.

Munhall, Pa., bars U5.

Pittsburgh, sheets C18.

Reading, Pa., strip except 34.25c on Type 301 and 56.00c on 309; bars, except 31.50c on Type 301 and 45.25c on 309 C4.

Sharon, Pa., strip, except Types 303, 309, 416, 501, 502 and 34.25c on Type 301 S3.

So. Chicago, Ill., bars & structurals U5.

Syracuse, N. Y., bars, wire & structurals C18.

Titusville, Pa., bars, U4.

Wallingford, Conn., strip W2 quotes 0.25c higher.

Washington, Pa., bars, sheets & strip, except 0.25c higher on Type 301 J3.

Washington, Pa., Types 301 through 347 sheets & strip except 303, 309; 316 sheets 62.00c, strip 64.00c W4.

Watervliet, N. Y., structurals & bars A4 quotes variations on Types 301-347.

Waukegan, bars & wire A7.

West Leechburg, Pa., strip, A4 quotes slight variations on Types 301-347.

Youngstown, strip except Types 303, 309, 316, 416, 501 and 502 and 34.25c on Type 301.

COAL CHEMICALS

Spot, cents per gallon, ovens	
Pure benzol	30.00-35.00
Toluol, one deg.	26.00-33.00
Industrial xylol	25.00-33.50
Per ton bulk, ovens	
Sulphate of ammonia	$32-$45
Cents per pound, ovens	
Phenol, 40 (carlots, non-returnable drums)	17.25

METAL POWDERS

(Per pound, f.o.b. shipping point in ton lots for minus 100 mesh, except as otherwise noted.)

Sponge iron	Cents
98+% Fe, carlots	17.00
Swedish, c.i.f. New York, in bags	8.85-9.95
Electrolytic Iron:	
Annealed, 99.5% Fe	42.50
Unannealed, 99+% Fe	36.50
Unannealed, 99+% Fe (minus 325 mesh)	58.50
Powder Flakes	48.50
Carbonyl Iron:	
97.9-99.8%, size 5 to 10 microns	83.00-148.00
Aluminum:	
Carlots, freight allowed	29.50
Atomized, 500 lb drums, freight allowed	33.50
Antimony	75.85
Brass, 10-ton lots	30.00-33.25
Bronze, 10-ton lots	51.25-60.00
Phosphor-Copper, 10 ton lots	50.00
Copper:	
Electrolytic	37.25-46.25
Reduced	33.75-37.00
Lead	25.50
Magnesium	75.00-85.00
Manganese:	
Minus 100-mesh	57.00
Minus 35 mesh	52.00
Minus 200 mesh	62.00
Nickel unannealed	86.00
Nickel-Silver, 10-ton lots	45.00
Silicon	38.50
Solder (plus cost of metal)	8.50
Stainless Steel, 302	83.00
Zinc, 10-ton lots	23.00-30.50
Tungsten	Dollars
Melting grade, 99%, 60 to 200 mesh, freight allowed:	
1000 lb and over	6.00
Less than 1000 lb	6.15
98.8% minus 65 mesh, freight allowed:	
1000 lb and over	4.15
Less than 1000 lb	4.25
Molybdenum:	
99.9%, minus 200 mesh	3.25
Chromium, electrolytic 99% Cr min.	3.50

METALLURGICAL COKE

Price per net ton

BEEHIVE OVENS

Connellsvll. fur.	$14.50-15.00
Connelsvll. fdry.	17.00-18.00
New River foundry	21.30
Wise county, foundry	15.95
Wise county, furnace	15.20

OVEN FOUNDRY COKE

Kearny, N. J. ovens	$22.75
Everett, Mass., ovens New England, del.	*24.80
Chicago ovens	23.00
Chicago, del.	24.50
Terre Haute, ovens	22.50
Milwaukee, ovens	23.75
Indianapolis, ovens	22.75
Chicago, del.	26.42
Cincinnati, del.	25.85
Detroit, del.	26.85
Ironton, O., ovens	22.50
Cincinnati, del.	25.12
Painesville, O., ovens	24.00
Cleveland, del.	25.82
Erie, Pa., ovens	23.50
Birmingham, ovens	20.30
Birmingham, del.	21.60
Philadelphia, ovens	22.70
Nevilleisland, Pa., ovens	23.00
Swedeland, Pa., ovens	22.60
St. Louis, ovens	
St. Louis, del.	25.40
Portsmouth, O., ovens	22.50
Cincinnati, del.	25.12
Detroit, ovens	24.00
Detroit, del.	25.00
Buffalo, del.	26.89
Flint, del.	26.59
Pontiac, del.	25.47
Saginaw, del.	28.92

* Or within $4.15 freight zone from works.

NONFERROUS METALS

(Cents per pound, carlots, except as otherwise noted)

Primary Metals

Copper: Electrolytic 24.50c, Conn. Valley; Lake 24.625c, delivered.

Brass Ingots: 85-5-5-5 (No. 115) 27.25c; 88-10-2 (No. 215) 38.50c; 80-10-10 (No. 305) 32.25c; No. 1 yellow (No. 405) 23.25c.

Zinc: Prime western 19.50c, brass special 19.75c, intermediate 20.00c, East St. Louis; high grade 20.85c, delivered.

Lead: Common 18.80c, chemical 18.90c, corroding 18.90c, St. Louis.

Primary Aluminum: 99% plus, ingots 19.00c, pigs 18.00c. Base prices for 10,000 lb and over. Freight allowed on 500 lb or more but not in excess of rate applicable on 30,000 lb c.l. orders.

Secondary Aluminum: Piston alloys 20.50c; No. 12 foundry alloy (No. 2 grade) 19.50c; steel deoxidizing grades, notch bars, granulated or shot; Grade 1, 18.00c; grade 2, 17.75c; grade 3, 17.25c; grade 4, 16.50c.

Magnesium: Commercially pure (99.8%) standard ingots, 10,000 lb and over 24.50c, f.o.b. Freeport, Tex.

Tin: Grade A, prompt 103.00c.

Antimony: American 99-99.8% and over but not meeting specifications below 50.00c; 99.8% and over (arsenic 0.05% max., other impurities 0.1% max.) 50.50c, f.o.b. Laredo, Tex., for bulk shipments.

Nickel: Electrolytic cathodes, 99.9%, base sizes at refinery, unpacked, 56.50c; 25 lb pigs, 59.15c; "XX" nickel shot, 60.15c; "F" nickel shot or ingots, for addition to cast iron, 56.50c. Prices include import duty.

Mercury: Open market, spot, New York, $212-$215 per 76 lb flask.

Beryllium-Copper: 3.75-4.25% Be, $1.50 per lb of alloy, f.o.b., Reading, Pa.

Cadmium: "Regular" straight or flat forms, $2.55 del.; special or patented shapes $2.80.

Cobalt: 97-99%, $2.40 per lb for 500 lb (kegs); $2.42 per lb for 100 lb (case); $2.47 per lb under 100 lb.

Gold: U. S. Treasury, $35 per ounce.

Silver: Open market, New York 88.00c per oz.

Platinum: $90-$93 per ounce from refineries.

Palladium: $24 per troy ounce.

Iridium: $200 per troy ounce.

Titanium (sponge form): $5 per pound.

Rolled, Drawn, Extruded Products

COPPER AND BRASS

(Ceiling prices, cents per pound, f.o.b. mill; effective Aug. 23, 1951)

Sheet: Copper 41.68; yellow brass 38.28; commercial bronze, 95% 41.61, 90% 41.13; red brass, 85% 40.14, 80% 39.67; best quality, 39.15; nickel silver, 18%, 53.14; phosphor bronze grade A, 5%, 61.07.

Rod: Copper, hot-rolled 37.53; cold drawn 38.78; yellow brass free cutting, 32.63; commercial bronze 95% 41.30, 90% 40.82; red brass 85% 39.83, 80% 39.36.

Seamless Tubing: Copper 41.72; yellow brass 41.29; commercial bronze, 90%, 43.79; red brass, 85%, 43.05.

Wire: Yellow brass 38.57; commercial bronze 95% 41.90, 90% 41.42; red brass 85% 40.43, 80% 39.96; best quality brass 39.44.

(Base prices, effective Dec. 26, 1951)

Copper Wire: Bare, soft, f.o.b. eastern mills, 100,000 lb lots, 28.545; 30,000 lb lots, 28.67; l.c.l. 29.17. Weatherproof, 100,000 lb, 30.35; 30,000 lb, 30.60; l.c.l., 31.10. Magnet wire, del., 15,000 lb or more, 34.50; l.c.l., 35.25.

ALUMINUM

(30,000 lb base; freight allowed on 500 lb or more but not in excess of rate applicable on 30,000 lb c.l. orders.)

Sheets and Circles: 2s and 3s mill finish c.l.

Thickness Range Inches	Widths or Diameters, In. Inc.	Flat Sheet Base*	Coiled Sheet Base	Coiled Sheet Circle† Base
0.249-0.136	12-48	30.1	...	...
0.135-0.096	12-48	30.6	...	...
0.095-0.077	12-48	31.2	29.1	33.2
0.076-0.061	12-48	31.8	29.3	33.4
0.060-0.048	12-48	32.1	29.5	33.7
0.047-0.038	12-48	32.5	29.8	34.0
0.037-0.030	12-48	32.9	30.2	34.6
0.029-0.024	12-48	33.4	30.5	35.0
0.023-0.019	12-36	34.0	31.1	35.7
0.018-0.017	12-36	34.7	31.7	36.6
0.016-0.015	12-36	35.5	32.4	37.6
0.014	12-24	36.5	33.3	38.9
0.013-0.012	12-24	37.4	34.0	39.7
0.011	12-24	38.4	35.0	41.2
0.010-0.0095	12-24	39.4	36.1	42.7
0.009-0.0085	12-24	40.6	37.2	44.4
0.008-0.0075	12-24	41.9	38.4	46.1
0.007	12-18	43.3	39.7	48.2
0.006	12-18	44.8	41.0	52.8

* Lengths 72 to 180 inches. † Maximum diameter, 26 inches.

Screw Machine Stock: 5000 lb and over.

Dia (in.) or distance across flats	Round R317-T4, 17S-T4	Hexagonal R-317-T4	Hexagonal 17S-T4
0.125	52.0	....	....
0.156-0.0188	44.0	....	....
0.219-0.313	41.5	....	....
0.375	40.0	46.0	48.0
0.406	40.0	....	....
0.438	40.0	46.0	48.0
0.469	40.0	....	....
0.500	40.0	46.0	48.0
0.531	40.0	....	....
0.563	40.0	....	45.0
0.594	40.0	....	....
0.625	40.0	43.5	45.0
0.688	40.0	....	45.0
0.750-1.000	39.0	41.0	42.5
1.063	39.0	....	41.0
1.125-1.500	37.5	39.5	41.0
1.563	37.0	....	....
1.625	36.5	....	39.5
1.688-2.000	36.5	....	....

LEAD

(Prices to jobbers f.o.b. Buffalo, Cleveland, Pittsburgh) Sheets: Full rolls, 140 sq ft or more $24.00 per cwt, add 50c cwt 10 sq ft to 140 sq ft. Pipe: Full coils $24.00 per cwt. Traps and bends: List prices plus 65%.

ZINC

Sheets 26.50c, f.o.b. mill 36,000 lb and over. Ribbon zinc in coils, 25.00c, f.o.b. mill, 36,000 lb and over. Plates, not over 12-in., 25.50-26.50c; over 12-in., 25.50-26.50c.

"A" NICKEL

(Base prices f.o.b. mill)

Sheets, cold-rolled, 77.00c. Strip, cold-rolled, 83.00c. Rods and shapes, 73.00c. Plates, 75.00c. Seamless tubes, 106.00c.

MONEL

(Base prices f.o.b. mill)

Sheets, cold-rolled 60.50c. Strip, cold-rolled 63.50c. Rods and shapes, 58.50c. Plates, 59.50c. Seamless tubes, 93.50c. Shot and blocks, 53.50c.

MAGNESIUM

Extruded Rounds 12 in. long, 1.31 in. in diameter, less than 25 lb, 55.00-62.00c; 25 to 99 lb, 45.00-52.00c; 100 lb to 5000 lb, 41.00c.

TITANIUM

(Prices per lb 10,000 lb and over, f.o.b. mill) Sheets, $15; sheared mill plate, $12; strip, $15; wire, $10; forgings, $6; hot-rolled and forged bars, $6.

Plating Materials

Chromic Acid: 99.9% flakes, f.o.b. Philadelphia, carloads, 27.00c; 5 tons and over 27.50c; 1 to 5 tons, 28.00c; less than 1 ton 28.50c.

Copper Anodes: Base 2000 to 5000 lb, f.o.b. shipping point, freight allowed: Flat, rolled, 38.34c; oval 37.84c.

Nickel Anodes: Rolled oval, carbonized, carloads, 74.50c; 10,000 to 30,000 lb, 75.50c; 3000 to 10,000 lb, 76.50c; 500 to 3000 lb 77.50c; 100 to 500 lb, 79.50c; under 100 lb, 82.50c; f.o.b. Cleveland.

Nickel Chloride: 36.50c in 100 lb bags; 34.50c in lots of 400 lb through 10,000 lb; 34.00c over 10,000 lb, f.o.b. Cleveland, freight allowed on 400 lb or more.

Sodium Stannate: 25 lb cans only, less than 100 lb, to consumers 77.7c; 100 or 350 lb drums only, 100 to 600 lb, 63.1c; 700 to 1900 lb, 60.6c; 2000 to 9900 lb, 58.9c. Freight allowed east of Mississippi and north of Ohio and Potomac rivers.

Tin Anodes: Bar, 1000 lb and over, $1.19; 500 to 999 lb, $1.195; 200 to 499 lb, $1.20; less than 200 lb, $1.215. Freight allowed east of Mississippi and north of Ohio and Potomac.

Zinc Cyanide: 100 lb drums, less than 10 drums 47.7c; 10 or more drums, 45.7c, f.o.b. Niagara Falls, N. Y.

Stannous Sulphate: 100 lb kegs or 400 lb bbl, less than 2000 lb $1.0009; more than 2000 lb, 98.09c. Freight allowed east of Mississippi and north of Ohio and Potomac rivers.

Stannous Chloride (Anhydrous): In 400 lb bbl, 87.23c; 100 lb kegs 88.23c. Freight allowed.

Scrap Metals

Brass Mill Allowances

Ceiling prices in cents per pound for less than 20,000 lb, f.o.b. shipping point, effective June 26, 1951

	Clean Heavy	Rod Ends	Clean Turnings
Copper	21.50	21.50	20.75
Yellow Brass	19.125	18.875	17.875
Commercial Bronze			
95%	20.50	20.25	19.75
90%	20.50	20.25	19.75
Red Brass			
85%	20.25	20.00	19.375
80%	20.125	19.875	19.375
Muntz metal	18.125	17.875	17.375
Nickel silver, 10%	21.50	21.25	10.75
Phos. bronze, 5%	25.25	25.00	24.00

Copper Scrap Ceiling Prices

(Base prices, cents per pound, less than 40,000 lb f.o.b. point of shipment)

Group I: No. 1 copper 19.25; No. 2 copper wire and mixed heavy 17.75; light copper 16.50; No. 1 borings 19.25; No. 2 borings 17.75; refinery brass, 17.00 per lb of dry Cu content for 50 to 60 per cent material and 17.25 per lb for over 60 per cent material.

Group II: No. 1 soft red brass solids 18.50; No. 1 composition borings 19.25 per lb of Cu content plus 63 cents per lb of tin content; mixed brass borings 19.25 per pound of Cu content plus 60 cents per lb of tin content; unlined red car boxes 18.25; lined red car boxes 17.25; cocks and faucets 16.00; mixed brass screens 16.00; zincy bronze solids and borings 16.25.

Zinc Scrap Ceiling Prices

(Cents per pound, f.o.b. point of shipment)

Unsweated zinc dross, 13.75c; new clippings and trimmings, 15.50c; engravers' and lithographers' plates, 15.50c; die cast slabs, min. 90% zinc, 13.75c; old zinc scrap, 12.25c; forming and stamping dies, 12.25c; new die cast scrap, 11.75c; old zinc die cast radiator grille, 11.50c; old die cast scrap, 10.50c.

Lead Scrap Ceiling Prices

(F.o.b. point of shipment)

Battery lead plates, 15.00c per lb of lead and antimony content, less smelting charge of 2 cents per lb of material in lots 15,000 lb or more; less 2.25c in lots less than 15,000 lb, or a flat price of 11.25c a pound of battery plates. Used storage batteries (in boxes) drained of liquid, 7.65c for 15,000 lb or more; 7.45c for less than 15,000 lb. Soft lead scrap, hard lead scrap, battery slugs, cable lead scrap or lead content of lead-covered cable scrap, 17.25c in lots of 20,000 lb or more; 16.50c in lots under 20,000 lb.

Aluminum Scrap Ceiling Prices

(Cents per pound f.o.b. point of shipment, less than 5000 lb)

Segregated plant scrap: 2s solids, copper free, 10.50; high grade borings and turnings, 8.50; No. 12 piston borings and turnings, 7.50; Mixed plant scrap: Copper-free solids, 10.00; dural type, 9.00; Obsolete scrap: Pure old cable, 10.00; sheet and sheet utensils, 7.25; old castings and forgings, 7.75; clean pistons, free of struts, 7.75; pistons with struts, 5.75.

DAILY PRICE RECORD

1952	Copper	Lead	Zinc	Tin	Aluminum	Antimony	Nickel	Silver
Jan. 2-3	24.50	18.80	19.50	103.00	19.00	50.00	56.50	88.00
1951								
Dec. 1-31	24.50	18.80	19.50	103.00	19.00	50.00	56.50	88.00
Dec. Avg.	24.50	18.80	19.50	103.00	19.00	50.00	56.50	88.00
Nov. Avg.	24.50	18.80	19.50	103.00	19.00	44.56	56.50	88.00
Oct. Avg.	24.50	18.726	19.426	103.00	19.00	42.00	56.50	88.12
Sept. Avg.	24.50	16.80	17.50	103.00	19.00	42.00	56.50	90.16
Aug. Avg.	24.50	16.80	17.50	103.00	19.00	42.00	56.50	90.16
July Avg.	24.50	16.80	17.50	106.00	19.00	42.00	56.50	90.16
June Avg.	24.50	16.80	17.50	117.962	19.00	42.00	56.50	88.492
May Avg.	24.50	16.80	17.50	139.923	19.00	42.00	50.50	90.16
Apr. Avg.	24.50	16.80	17.50	145.735	19.00	42.00	50.50	90.16

NOTE: Copper: Electrolytic del. Conn. Valley. Lead, common grade, del. St. Louis. Zinc, prime western, E. St. Louis. Tin, Straits, del. New York. Aluminum, primary ingots, 99%, del.; Antimony, bulk, f.o.b. Laredo, Tex. Nickel, electrolytic cathodes, 99.9%, base sizes at refinery unpacked. Silver, open market, New York. Prices, cents per pound; except silver, cents per ounce.

The Metal Market

Production of major nonferrous metals will increase in 1952, but increased military requirements will force continuation of restrictions on their use in civilian goods

LARGER supplies of major nonferrous metals will be available to fabricators in 1952 than in the year just ended. A larger proportion of the tonnages will be required to meet expanding military needs and essential needs, indicating that producers will be forced to curtail output of many types of consumer goods. The overall demand-supply situation will remain tight at least through the first half.

Allotments of controlled materials to the automobile industry, for instance, were cut for the first quarter from those for the fourth quarter of last year and will be cut further during the second quarter. Officials of the Defense Production Administration hope to allot enough aluminum and steel for production of 1 million passenger cars in the second quarter and enough copper for 800,000 cars. They expressed belief auto makers could stretch such copper allotments by conservation methods. Allotments in the January-March period should be sufficient for 1.8 million automobiles.

Domestic consumers of nonferrous metals have been denied their normal share of world supplies because under the government's price ceilings they cannot pay the prevailing prices in foreign markets. In copper, the United States price is 27.50c a pound while the average world price is around 35.00c a pound. The spread in lead prices is narrowing, indicating larger imports of this metal may be received later this year.

Canadian Aluminum — Under a special arrangement, the United Kingdom is releasing 11,000 tons of Canadian primary aluminum to us at the rate of 2200 tons a month, beginning last month. This is over and above Aluminum Co. of Canada's regular commercial shipments which totaled nearly 100,000 tons in 1951. The company is constructing a large new aluminum plant in British Columbia which will begin supplying substantial quantities of aluminum ingot in 1954. Were it not for the increased Canadian supply, allotments for the first quarter would have been cut to 10 per cent of base period use from the present 20 per cent.

Expansion of facilities for the production of aluminum was one of the outstanding developments in the metalworking field last year. The industry's primary aluminum production for 1951 is estimated at between 832,000 and 840,000 tons. This represents an increase of over 16 per cent over the nation's 1950 output and indicates that 1951 will be the second highest production year in the history of the industry, being exceeded only by World War II year of 1943 when 920,000 tons of the metal were produced.

Increases in primary aluminum annual capacity so far scheduled since the outbreak of hostilities in Korea total about 750,000 tons. About 550,000 tons of this expansion will be in new plants and 200,000 tons in existing plants, says Donald M. White, secretary, Aluminum Association, New York. Of the scheduled expansion, about 150,000 tons were in operation at the end of 1951 when the industry was producing about 2500 tons of primary metal a day. An additional 400,000 tons is scheduled to begin production this year and the remaining 200,000 tons in 1953, making the industry's primary capacity 1,500,000 tons.

Magnesium Output Soars — The magnesium industry also is experiencing a spectacular growth. Production of magnesium, including about 8000 tons from secondary sources, increased to about 48,000 tons in 1951 from 21,700 tons in 1950. Production of magnesium in 1952 is estimated at about 107,500 tons, of which 97,500 tons will consist of primary metal and 10,000 tons of secondary.

The rated annual capacity of the six government-owned plants that have been put into operation is about 98,000 tons. This amount, plus the rated capacity of 24,000 tons of Magnesium Division, Dow Chemical Co., give a combined rated capacity of 122,000 tons. Capacity of the industry at its peak in World War II was 293,000 tons and the record output was 184,000 tons in 1943.

Sufficient magnesium will be provided in 1952 for all military and stockpiling needs, but not for all civilian requirements.

Copper To Remain Tight—In contrast to the spurt in production of the light weight metals, only a gradual rise in production of copper can be expected. Monthly average supply in 1952 for domestic consumption is estimated at 125,000 tons, providing none is diverted to the stockpile. This tonnage would be obtained from domestic mines, imports and intake of scrap by custom smelters. The projected volume for 1952 of 1,500,000 tons would compare with about 1,609,000 tons in 1951 and 1,747,000 tons in 1950. During 1953 there will be an additional 200,000 tons of new copper from expanding programs initiated here and abroad, some with government aid. Government officials estimate about 27 per cent of this year's supply will go for military programs.

Zinc Outlook Improves—Supply of zinc is nearly as short as that of copper. While the outlook under current conditions is for a continuance of the shortage for the immediate future, so far as the long-range view is concerned there are strong indications that supply and requirements can be brought into balance by other means than restricting use.

Slab zinc production in the United States totaled about 925,000 to 930,000 tons in 1951 compared with 910,354 tons in 1950 and an all-time high of 990,000 tons in 1943. If sufficient concentrates are made available to United States smelters, they could produce over 1 million tons in 1952. Domestic mine production of zinc concentrates in 1951 totaled about 675,000 tons of metal content and is expected to increase slightly in 1952. With projected requirements in 1952 estimated at 1.1 million tons of recoverable zinc, something over 500,000 tons must be imported. So long as prices abroad continue to divert zinc concentrates to other countries, it will be difficult to solve the problem of securing sufficient feed material for smelters and pigment plants. The American Zinc Institute says "there are indications that world concentrate requirements may approach a balance in 1952," which, if true, should result in an easing of the position of United States smelters in the latter part of 1952 or in 1953.

On the demand side, while defense requirements are high, curtailment of construction, automobile production, and other similar restrictions affect the use of zinc and other metals. There also is another factor which was noticeable in World War II when the shortages of other materials in many industries reduced operations of these industries and, hence, their requirements of zinc.

Free Lead Market — Lead is in slightly better supply and the present shortage will be eased considerably as soon as the gap between world and domestic price levels is closed. In normal times, about one-third of the lead consumed in this country is imported, another one-third comes from scrap and the remainder from primary producers. Due chiefly to the sharp drop in imports and reduction in scrap lead receipts, supplies of the metal declined to about 484,000 tons in 1951 from 571,763 tons in 1950.

Andrew Fletcher, president, St. Joseph Lead Co., said in his summary of the lead situation: "The government is exhorting producers for greater output, and devising expedients such as price floors, loans, outright subsidies and curtailment of uses, but to date has been unwilling to return to the only practical remedy for curing the shortage—a free market."

Tin Remains Unsettled — Many interests in the tin market attribute the unsettled conditions in that metal to governmental interference. Although world tin production exceeded consumption in 1951 by an estimated 26,500 tons, stocks held by consumers and by the Reconstruction Finance Corp. are almost depleted. At the same time, allocations to consumers were reduced progressively and their manufacturing operations severely interfered with. Toward the close of the year, Secretary of State Acheson urged RFC Administrator Symington to review his policy on the purchase of Bolivian tin. Negotiations over a contract price collapsed when United States officials refused to revise their offer of $1.12 a pound while Bolivian producers asked for a price of $1.50.

WAREHOUSE STEEL PRODUCTS

(Representative prices, cents per pound, for delivery within switching limits, subject to extras.)

	SHEETS			STRIP		BARS			Standard Structural Shapes	PLATES	
	H.R. 18 Ga. Heavier*	C.R.	Gal 10 Ga.†	H.R.*	C.R.*	H.R. Rds.	C.F. Rds.	H.R. Alloy 4140§		Carbon	Floor
New York (city)	6.54	7.21	8.35	7.05		6.62	7.53	9.28	6.37	6.71	7.98
JerseyCity (c'try)	6.24	6.91	8.25	6.75		6.32	7.23	8.98	6.07	6.41	7.68
Boston (city)	6.40	7.18	8.63	6.35		6.25	7.04	9.00	6.40	6.86	7.84
Boston (c'try)	6.20	6.98	8.43	6.15		6.05	6.84	9.20	6.20	6.66	7.64
Phila (city)	6.97	7.05	8.38	6.33	7.11	6.30	7.16	8.92	7.84	6.34	7.40
Phila (c'try)	6.72	6.80	8.13	6.08	6.86	6.05	6.91	8.67	7.59	6.09	7.15
Balt (city)	6.22	7.00	8.40	6.23		6.21	6.85		6.33	6.33	7.57
Balt (c'try)	6.02	6.80	8.20	6.03	....	6.01	6.63		6.13	6.13	7.37
Norfolk Va	6.78	....	....	....	....	6.00	7.20		6.30	6.30	7.15
Richmond Va	5.95	6.57	8.10	6.14		5.91	6.59		6.22	6.86	7.47
Wash (w'hse)	6.02	7.26	8.45	6.46		6.46	7.26		6.56	6.22	7.86
Buffalo (del)	5.80	6.60	8.29	6.06		5.80	6.65	10.65	6.00	6.25	7.55
Buffalo (w'hse)	5.60	6.40	8.09	5.86		5.60	6.45	10.45	5.80	6.05	7.35
Pitts (w'hse)	5.50	6.32	7.85	5.59	6.90	5.45	6.20	10.30	5.65	5.65	6.89
Detroit (w'hse)	5.79	6.47	7.99	5.76	7.15	6.14	6.89	9.13	6.32	5.88	7.41
Cleveland (del)	5.74	6.52	8.1[illegible]	5.85	7.18	5.77	6.60	8.91	6.15	6.15	7.39
Cleve (w'hse)	5.54	6.32	7.9[illegible]	5.65	6.98	5.57	6.40	8.71	5.95	5.95	7.19
Cincin (city)	5.90**	6.53	8.44	6.45		5.90	6.79		6.24	6.29	7.43
Chicago (city)	5.76	6.55	8.08	5.77		5.67	6.50	10.50	5.88	5.90	7.09
Chicago (w'hse)	5.56	6.35	7.88	5.57		5.47	6.30	10.30	5.68	5.70	6.89
Milwau (city)	5.90	6.76	8.21	5.85		5.83	6.76	10.85	6.01	6.06	7.25
Milwau (c'try)	5.70	6.56	8.01	5.65		5.63	6.56	10.65	5.81	5.86	7.05
St Louis (del)	6.05	6.85	8.20	6.00		6.00	6.85	10.55	6.23	6.33	7.53
St L (w'hse)	5.85	6.65	8.00	5.80		5.80	6.65	10.35	6.03	6.13	7.33
Kans City (city)	6.40	7.20	8.40	6.35		6.35	7.20		6.50	6.60	7.80
KansCity (w'hse)	6.20	7.00	8.20	6.15		6.15	7.00		6.30	6.40	7.60
Birmham (city)	5.75	6.55	6.90	5.70		5.70	7.53		5.85	6.10	8.25
Birmhm (w'hse)	5.60	6.40	6.75	5.55		5.55	7.53		5.70	5.95	8.23
Los Ang (city)	6.55	8.10	9.05	6.60	8.90	6.55	7.75		6.55	6.60	9.20
L A (w'hse)	6.35	7.90	8.85	6.40	8.70	6.35	7.55		6.35	6.40	8.70
Seattle-Tacoma	7.04	8.96	9.65	7.04		6.70	9.00	10.35	6.54	6.78	8.73
San Francisco	7.05	8.60	9.20	7.30	....	6.75	9.10	11.15	6.65	6.75	8.80

* Prices do not include gage extras; † prices include gage and coating extras, except Birmingham (coating extra excluded) and Los Angeles (gage extra excluded); ‡ includes extra for 10 gage; § as rolled; ** 16 gage; †† as annealed; ‡‡ 15 gage. Base quantities, 2000 to 9999 lb except as noted: Cold-rolled strip, 2000 lb and over; cold-finished bars, 2000 lb and over; 1—500 to 1499 lb; 2—450 to 1499 lb; 3—3500 lb and over; 4—1000 to 1999 lb.

Ores

Lake Superior Iron Ore

Gross ton, 51½% (natural), lower lake ports.

After adjustment for analysis, prices will be increased or decreased as the case may be for increases or decreases after Dec. 2, 1950, in applicable lake vessel rates, upper lake rail freights, dock handling charges and taxes thereon.

Old range bessemer	$8.70
Old range nonbessemer	8.55
Mesabi bessemer	8.45
Mesabi nonbessemer	8.30
High phosphorus	8.30

Eastern Local Ore

Cents per unit, del. E. Pa.

Foundry and basic 56-62% concentrates contract	17.00

Foreign Ore

Cents per unit, c.i.f. Atlantic ports

Swedish basic, 60 to 68%	
Spot	17.00
Long-term contract	15.00
North African hematites	17.00
Brazilian iron ore, 68-69%	24.00-25.00

Tungsten Ore

Net ton unit, duty paid

Foreign wolframite and scheelite, per net ton unit	$65.00
Domestic scheelite, mines	65.00

Manganese Ore

Manganese, 48%, nearby, $1.18-$1.22 per long ton unit, c.i.f. U. S. ports, duty for buyer's account; shipments against old contracts for 48% ore are being received from some sources at 79.8-81.6c.

Chrome Ore

Gross ton, f.o.b. cars New York, Philadelphia, Baltimore, Charleston, S. C., plus ocean freight differential for delivery to Portland, Oreg., or Tacoma, Wash.

Indian and African

48% 2.8:1	$32.50
48% 3:1	35.00-36.00
48% no ratio	26.00

South African Transvaal

44% no ratio	$27.00-28.00
48% no ratio	34.00-35.00

Brazilian

44% 2.5:1 lump	$32.00

Rhodesian

45% no ratio	$20.00-21.00
48% no ratio	26.00
48% 3:1 lump	35.00-36.00

Domestic (rail nearest seller)

48% 3:1	$39.00

Molybdenum

Sulphide concentrates, per lb, molybdenum content, mines	$1.00

MANGANESE ALLOYS

Spiegeleisen: (19-21% Mn, 1-3% Si) Carlot per gross ton, $75 Palmerton, Pa., $75 Pittsburgh and Chicago; (16% to 19% Mn) $1 per ton lower.

Standard Ferromanganese: (Mn 78-82%, C 7% approx.) Carload, lump, bulk $185 per gross ton of alloy, c.l. packed, $197; gross ton lots, packed, $212; less gross ton lots, packed, $229, f.o.b. Alloy, W. Va., Niagara Falls, N. Y., or Ashtabula, O. Base price: $187, Johnstown, Pa.; $185, Sheridan, Pa.; $188, Etna, Pa.; $190, Chattanooga, Tenn.; $186, Anaconda, Mont.

Shipment from Pacific Coast warehouses by one seller, add $33 to above prices f.o.b. Los Angeles, Oakland, Portland, Oreg. Shipment from Chicago warehouse, ton lots $227; less gross ton lots, $244, f.o.b. Chicago. Add or subtract $2.30 for each 1% or fraction thereof, of contained manganese over 82% and under 78%, respectively.

Low Carbon Ferromanganese, Regular Grade: (Mn 85-90%.) Carload, lump, bulk, max. 0.07% C, 25.75c per lb of contained Mn, carload packed 26.5c, ton lots 27.6c, less ton 28.8c. Delivered. Deduct 0.5c for max. 0.15% C grade from above prices, 1c for max. 0.30% C, 1.5c for max. 0.50% C, and 4.5c for max. 75% C, max. 7% Si. **Special Grade:** (Mn 90% min., C 0.07% max., P 0.06% max.) Add 0.5c to above prices. Spot, add 0.25c.

Medium Carbon Ferromanganese: (Mn 80-85%, C 1.5% max.) Carload, lump, bulk 19.15c per lb of contained Mn, carload packed 19.9c, ton lot 21.0c, less ton 22.2c. Delivered. Spot, add 0.25c.

Manganese metal, 2" x D (Mn 96% min., Fe 2% max., Si 1% max., C 0.2% max.): Carload, lump, bulk, 34c per lb of metal; packed, 34.75c; ton lot 36.25c; less ton lot 38.25c. Delivered. Spot, add 2c.

Manganese Electrolytic: 40,000 lb or more, 28c; 2000 to 39,999 lb, 30c; 250 to 1999 lb, 32c. Premium for hydrogen-removed metal 1.5c per pound. F.o.b. cars Knoxville, Tenn. Freight allowed to St. Louis or to any point east of Mississippi.

Silicomanganese: (Mn 65-68%.) Contract, lump, bulk, 1.50% C grade, 18-20% Si, 9.90c per lb of alloy, carload packed, 10.65c, ton lot 11.55c, less ton 12.55c. Freight allowed. For 2% C grade, Si 15-17%, deduct 0.2c from above prices. For 3% C grade, Si 12-14.5%, deduct 0.5c from above prices. Spot, add 0.25c.

TITANIUM ALLOYS

Ferrotitanium, Low-Carbon: (Ti 20-25%, Al 3.5% max., Si 4% max., C 0.10% max.) Contract, ton lot, 2" x D, $1.50 per lb of contained Ti; less ton $1.55. (Ti 38-43%, Al 8% max., Si 4% max., C 0.10% max.) Ton lot $1.35, less ton $1.37, f.o.b. Niagara Falls, N. Y., freight allowed to St. Louis. Spot, add 5c.

Ferrotitanium, High-Carbon: (Ti 15-18%, C 6-8%.) Contract $177 per net ton, f.o.b. Niagara Falls, N. Y., freight allowed to destinations east of Mississippi river and north of Baltimore and St. Louis.

Ferrotitanium, Medium-Carbon: (Ti 17-21%, C 2-4.5%.) Contract, $195 per ton, f.o.b. Niagara Falls, N. Y., freight not exceeding St. Louis rate allowed.

OTHER FERROALLOYS

Ferrocolumbium: (Cb 56-60%, Si 8% max., C 0.4% max.) Contract, ton lot, 2" x D, $4.90 per lb of contained Cb, less ton $4.95. Delivered. Spot, add 10c.

Ferrotantalum—Columbium: (Cb 40% approx., Ta 20% approx., and Cb and Ta 60% min., C 0.30 max.) ton lots, 2" x D, $3.75 per lb of contained Cb plus Ta, deld.; less ton lots $3.80.

Sileaz Alloy: (Si 35-40%, Ca 9-11%, Al 6-8%, Zr 3-5%, Ti 9-11%, B 0.55-0.75%.) Carload packed, 1" x D, 45c per lb of alloy, ton lot 47c, less ton 49c. Delivered.

SMZ Alloy: (Si 60-65%, Mn 5-7%, Zr 5-7%, Fe 20% approx.) Contract, carload, packed, ½" x 12 M, 17.5c per lb of alloy, ton lots 18.25c, less ton 19.5c. Deld. Spot, add 0.25c.

Graphidox No. 4: (Si 48-52%, Ca 5-7%, Ti 9-11%.) C.l. packed, 18c per lb of alloy; ton lots 19c; less ton lots 20.50c, f.o.b. Niagara Falls, N. Y.; freight allowed to St. Louis.

V-5 Foundry Alloy: (Cr 38-42%, Si 17-19%, Mn 8-11%.) C.l. packed, 15c per lb of alloy; ton lots 16.50c; less ton lots 17.75c, f.o.b., Niagara Falls; freight allowed to St. Louis.

Simanal: (Approx. 20% each Si, Mn, Al; bal. Fe) Lump, carload, bulk 14.50c, packed 15.50c; ton lots, packed, 15.75c; less ton lots, packed, 16.25c per lb of alloy, delivered to destination within United States.

Ferrophosphorus: (23-25% based on 24% P content with unitage of $3 for each 1% of P above or below the base); carloads, f.o.b. sellers' works, Mt. Pleasant, or Siglo, Tenn., $65 per gross ton.

Ferromolybdenum: (55-75%). Per lb, contained Mo, f.o.b. Langeloth, $1.32; Washington, Pa., furnace, any quantity $1.32.

Technical Molybdic-Oxide: Per lb, contained Mo, f.o.b. Langeloth $1.14, packed in bags containing 20 lb of molybdenum; Washington, Pa., $1.13.

NOTE: Current prices on chromium, silicon, vanadium, boron and tungsten alloys appeared on page 95, Dec. 24 issue; calcium, zirconium and briquetted alloys, page 89, Dec. 31. Refractories prices also were published on page 89, Dec. 31 issue.

Sheets, Strip . . .

Sheet and Strip Prices, Page 559 & 560

Cleveland—Threatened steel strike at turn of the year served to generate pressure for shipments from some quarters. In the main, however, the holiday lull in manufacturing operations was reflected in a general easing in demand pressure. Additional cuts in allotments on consumer durable goods account are scheduled for second quarter.

Philadelphia—Overall demand has eased. Slackening in consumer goods requirements is not made up by defense tonnage. Yet in opening books for second quarter, carbon schedules are practically filled with most mills. Chromium stainless orders are below capacity. Some grades of silicon and enameling stock are soft.

Boston—Slower demand for narrow cold strip has not resulted in any reductions in hot strip allocations to converters for second quarter. All are taking the base tonnage due them. Cold strip backlogs are lower and new orders are slower with reductions in consumer allotments.

Cincinnati — Sheet mills here resumed operations on capacity schedules after the Christmas holiday shutdowns. Carryover from fourth quarter is indicated. Pressure for shipments was off during the holidays.

Chicago—Easing in demand for cold-rolled sheets, evident in some market areas, still is not observed here. Diversification of manufacture keeps requirements high.

Steel Bars . . .

Bar Prices, Page 559

Philadelphia—First quarter carbon and alloy bar capacity is filling with few carbon openings left. Volume of quality bars in larger sizes is mounting for shell steel and forgings. Backlogs with forge shops are growing. Slight easing in small bars in carbon grades is noted.

Boston—Imbalance between products and various grades and quality of products is expected during the next six months. This is showing up in bars, notably hot-topped quality grades in larger sizes.

Cleveland—With military and defense requirements still months from peak, expectations are carbon and alloy bars will continue in tight supply through most of 1952. Additional cuts in consumer goods allotments, proposed for second quarter, will not materially change supply conditions.

Chicago—Despite declining production of consumer goods there is no indication supply of bars will come close to matching demand in first quarter.

Tubular Goods . . .

Tubular Goods Prices, Page 565

Washington—Effective Jan. 1, buyers of oil country casing, tubing and drill pipe from warehouses must have allotments from the Petroleum Administration for Defense. NPA also eliminated certain limitations on tonnages of materials which distributors of oil well goods have been required to deliver on rated orders to a single customer in any calendar week. After Jan. 1 distributors must make shipments against rated orders placed on them regardless of tonnages. Tonnage limitations still apply for other steel warehouses.

Plates . . .

Plate Prices, Page 559

Philadelphia—With second quarter books open, major problem of producers is to match rolling schedules with tonnage allotments. With first quarter allocations lower for freight cars, but some easing expected by third quarter, car builders will have difficulty in getting back to 10,000 cars per month this year.

Wire . . .

Wire Prices, Page 561

Boston—With some soft spots in demand consumers are slower in placing second quarter tonnage. Heading wire allocations are reduced about 25 per cent for first quarter, and bed spring wire 50 per cent.

Semifinished Steel . . .

Los Angeles — Bethlehem Pacific Coast Steel Corp.'s Vernon plant ended 26 years of openhearth steelmaking by switching to three electric furnaces pouring 384,000 tons of ingots annually.

Reinforcing Bars . . .

Reinforcing Bar Prices, Page 559

Chicago—The outlook for many construction jobs is dimmed by lack of reinforcing steel. Jobs that up to now had the green light now find allocations for first and second quarters cut.

Los Angeles—The Navy will open bids on construction of $21.5 million worth of transmitter and direction finder facilities at Naval Communications Station, Kodiak, Alaska.

Structural Shapes . . .

Structural Shape Prices, Page 559

Boston—Some states plan considerable bridge and highway work this winter, but ultimate fabricating shop schedules and completion will depend on getting steel rolling backlogs more current. Larger shop bookings have been well below capacity for some weeks.

Pig Iron . . .

Pig Iron Prices, Page 558

Pittsburgh—A. M. Byers Co. entered into contract with Midland Coke Co., subsidiary, Crucible Steel Co. of America, for delivery up to 6000 tons of bessemer pig iron monthly, shipments to begin late this year. Byers lent the coke company $550,000 on a note which matures Sept. 1, 1959, bearing interest at 3.5 per cent. This obligation is to be reduced at the rate of $1.75 per ton of iron as it is shipped.

Philadelphia—Majority of gray iron foundries are not sharing as heavily as expected in defense work. Pig iron is being rationed by the merchant furnaces while integrated furnaces can spare minimum tonnage due to

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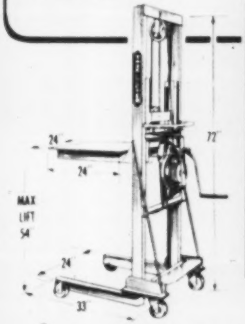

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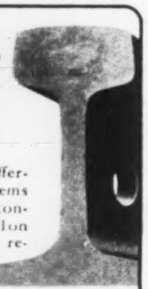

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Cincinnati—Defense needs have failed to reach most foundries so the effect of reduced backlogs for other castings is apparent in the district melt. Shipments of pig iron during January will be close to recent levels.

Chicago—Despite shrinking operations of jobbing gray iron foundries making light castings, pig iron sellers still find it necessary to allocate tonnage.

Scrap . . .

Scrap Prices, Page 562

Pittsburgh—Supply continues critical here with movement slowed down by bad weather. Some mills hold fair stocks; others are on a day-to-day basis and are borrowing scrap from other mills. Successful bidder for Pittsburgh's incinerator scrap, about 500 tons monthly, is Alpha Steel Co. at $21.26 a ton for 1952, increase of $1.76 a ton over price paid last half of 1951.

Boston—Allocations against dealer stocks are smaller. Yards are attempting to increase volume. Most railroad and government scrap continues to be allocated. Cast grades are slow and spotty.

Philadelphia—Steel scrap dealers are in no position to handle new allocations, yard stocks being depleted. Steel mills will need additional scrap if operations are to be maintained.

Chicago—Scrap outlook has grown more grim. Heavy snow blanket, coupled with extreme cold has throttled collections and yard activities. Two plants of United States Steel Co. have less than one week's supply. The Chicago area scrap drive turned up about 50,000 tons of dormant material.

Warehouse . . .

Warehouse Prices, Page 568

Philadelphia—Among warehouses, widest price spread is on standard structural shapes. Distributors paying a premium to one eastern Pennsylvania producer are quoting up to 7.81c Philadelphia.

Cleveland—There is lack of uniformity in warehouse quotations as established under CPR 98 because of varying costs, but expectations are prices generally will level out to the lowest level quoted in the district in competition for orders.

STRUCTURAL SHAPES . . .

STRUCTURAL STEEL PLACED

500 tons or more, stoplogs, gates, machinery, etc., McNary dam fish collection system, to Premier Gear & Machine Works, Portland, Oreg., low $1,409,572, by U. S. Engineer, Walla Walla, Wash.

500 tons, galvanized transmission towers, Pennsylvania Power & Light Co., Nazareth, Pa., to Lehigh Structural Steel Co., Allentown, Pa.

775 tons, subway extension, Market street, Philadelphia, to Bethlehem Steel Co.

STRUCTURAL STEEL PENDING

3125 tons, state highway bridges, Montgomery county, Pennsylvania; bids in.

1100 tons, state highway bridge, Bucks county, Pennsylvania; bids in.

1000 tons, Mount Rainier Army warehouse, Washington state, W. G. Clark & Co., Seattle, low $1,186,994 to U. S. Engineer, Seattle, bidder design; Zoss Construction Co., Portland, Oreg., low $1,346,504, government design.

325 tons, state highway bridges, Crawford county, Pennsylvania; bids in.

250 tons, two 185-ton bridge cranes for Chief Joseph dam; Judson-Pacific-Murphy Co., Emeryville, Cal., low $322,531, to U. S. Engineer, Seattle.

110 tons, state highway bridge, Schuylkill county, Pennsylvania; bids in.

Unstated, machine shop building, also 20-ton traveling crane and materials handling system, McNary dam; bids to U. S. Engineer, Walla Walla, Wash., Jan. 8.

REINFORCING BARS . . .

REINFORCING BARS PLACED

700 tons, by-product coke plant, Clairton, Pa., to United States Steel Supply Co., Pittsburgh.

150 tons, two Washington state highway projects, to Northwest Steel Rolling Mills Inc., Seattle; N. Fiorito, Seattle, general contractor.

REINFORCING BARS PENDING

710 tons, state highway and bridges, Montgomery county, Pennsylvania; bids in.

700 tons, power plant, Duquesne Light Co., Elrama, Pa.

250 tons plus, Saddle Gap and PE 17 pumping stations, Columbia Basin project, also 25,000 feet 15 to 60-inch pressure pipe, cranes, switchyards, etc.; bids to Bureau of Reclamation, Ephrata, Wash., Feb. 5.

PLATES . . .

PLATES PLACED

500 tons, tanks, Atlantic Refining Co., Philadelphia, to Hammond Iron Works, Bristol, Pa.

225 tons, 30-inch steel pipe, water department, Philadelphia, to Bethlehem Steel Co.

PLATES PENDING

6200 tons, web and T-section, cofferdam and powerhouse, The Dalles, Oreg.; bids to U. S. Engineer, Portland, Oreg., Dec. 27; construction bids to same agency, Jan. 22.

100 tons, ½ million gallon, galvanized steel welded water reservoir; bids to Lakewood water district, Pierce county, Washington, Dec. 27; district has allotment for 82 tons.

Unstated, 693-mile, 24-inch diameter, oil pipe line, Edmonton, Alta., to Vancouver, B. C., $82 million project; general contracts to Mannix Ltd., Calgary, Alta., and Comstock Midwestern Ltd., Toronto.

PIPE . . .

CAST IRON PIPE PENDING

Unstated, various sizes for system extension; bids to Tacoma, Wash., Jan. 10.

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Metalworking Briefs . . .

CONSTRUCTION—ENTERPRISE—ORGANIZATIONAL CHANGES

Bearing Makers Organize

A new trade organization of national scope, to be known as the Association of Bearing Specialists, was incorporated under Illinois laws. William F. Chase, president, Bearing Service Co., Pittsburgh, is chairman of the board of the association. Other officers are: J. R. Gelomb, president, Iowa Bearing Co., Davenport, Iowa, president; Gene Tappero, president, Michigan Bearing Co., Detroit, vice president; W. S. McClendon, general manager, Behrings Bearing Service Inc., Houston, secretary; Harold E. Johnson, president, General Bearings Co., Chicago, treasurer.

In addition to W. F. Chase and W. S. McClendon, board members are: G. W. Elftman, president, General Bearings Co., Los Angeles; J. Hudson Crockett, president, Standard Machine & Supply Co., Norfolk, Va.; Frank J. Stevens, president, Bearing Distributors Inc., Kansas City, Mo.; J. K. Weiser, president, Minnesota Bearing Co., Minneapolis.

Hooker Buys Building Site

Port of Tacoma, Tacoma, Wash., sold a 20-acre tract waterway frontage to Hooker Electrochemical Co., Niagara Falls, N. Y., for anticipated future plant expansion.

Eastern Names Export Agent

Eastern Stainless Steel Corp., Baltimore, appointed International Selling Corp., New York, as its exclusive export representative.

Builds Galvanizing Plant

Emsco Derrick & Equipment Co., Los Angeles, is constructing a plant for galvanizing at 6811 So. Alameda St., that city. Completion is scheduled by Aug. 1, 1952. The company manufactures oilfield drilling and production equipment and does structural steel fabricating and galvanizing.

Tool & Die Firm Organized

A business name was filed in the Erie county, New York, clerk's office for the Evergreen Tool & Die Co., 655 Wayne Dr., Derby, N. Y., by Norman T. Tanley.

MORE COMING: Workmen erect a girder for a skip hoist that will carry material to a blast furnace for charging. The 210-foot blast furnace is under construction at U. S. Steel's new Fairless Works near Morrisville, Pa., now 30 per cent completed

80-Year Old Plant To Close

New York Car Wheel Co., Buffalo, will close its plant early in 1952, culminating an 80-year old industrial operation. Robert A. Cooley, manager, said operations will be consolidated with the Albany Car Wheel Co. in Albany, N. Y. New York Car Wheel was purchased last spring by L. B. Smith, who also owns the Albany company, during reorganization proceedings under the Bankruptcy Act. Part of the New York Car Wheel plant will be razed because it is in the path of the Thruway.

Offers New Plating Process

John S. Nachtman, 2801 Quebec St., N. W., Washington, was granted a patent on a new process and apparatus for high-speed, continuous plating of metal strip. The patent number is 2,576,074; date of issue, Nov. 20, 1951. Mr. Nachtman is prepared to grant licenses for its use.

Star Cutter Co. Moves

Star Cutter Co. moved its office and plant to 34500 Grand River Ave., Farmington, Mich.

Trimedge Plans Expansion

Trimedge Inc., Youngstown, producer of metal molding, announced a $750,000 expansion program which will sharply boost its production. The plan calls for installing an aluminum smelting plant in a building now used as a warehouse and for installing an aluminum extrusion press in a new plant to be located

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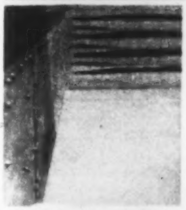
AFTER . . . this car spent 10 days in the CFC Shop it was transformed into efficient rolling stock. Steel plate flooring and siding made it easy to empty and sturdy to take the abuse of unloading buckets. Welded joints added strength and completely eliminated leakage. The reconditioned trucks and repacked journal boxes provided smooth rolling. Exterior painting made it look brand new (which it practically is!).



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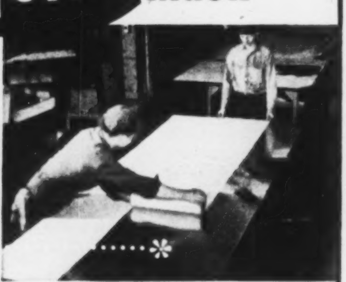
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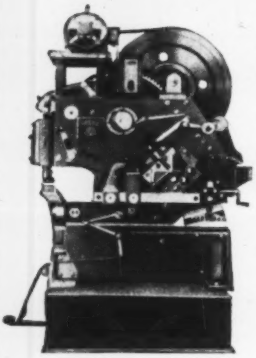
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Atlas Has Big Order Backlog

Atlas Steel Casting Co., Buffalo, has a seven-months backlog of civilian orders, says Clinton R. Wykoff Jr., president. Business includes castings for the railroads and machine tool industry. The firm has just received a large order from the Navy for firepower castings that will take two years to complete.

GE To Construct Crystals

Construction of crystals for U. S. Signal Corps radio communications equipment will be started this month in General Electric Co.'s germanium production plant in Clyde, N. Y.

Tool & Die Firm Expands

A & M Tool & Die Co. Inc., Southbridge, Mass., added new machinery and increased floor space 30 per cent for production of plastic molds, tools, dies and special machinery.

Union Steel To Build Plant

Union Steel Co., Santa Ana, Calif., will build a 250,000 square foot steel fabricating and manufacturing plant on a 10-acre tract southeast of that city.

Gerrard Moves Plant

Gerrard Steel Strapping Division, United States Steel Co., is transferring its Southern Division plant and offices from New Orleans to the former Pittsburgh Plate Glass Co. building at Ninth avenue and 20th street N., Birmingham. Plans are being made for the production of flat steel strapping, for which materials can be supplied from Tennessee Coal & Iron Division's cotton tie and hoop mill. Harry G. Walter, president of Gerrard, says sales through the Birmingham headquarters are expected to be increased in the next ten years by 68 per cent. Arthur G. Hill, now in the New Orleans office, will be manager of the Birmingham facilities.

To Build New Type Starter

Bendix Aviation Corp., Detroit, will soon begin production of an airborne starter for jet plane engines at the company's newly acquired plant in Utica, N. Y. The firm said the starter will be the first manufactured that will operate without ground crews or ground equipment.

Thomas Opens Branch Plant

Thomas Associates, Los Angeles, opened a branch plant at Coffeyville, Kans., to manufacture aircraft clips and clamps.

Frontier Forge Organized

A business name was filed in the Erie county, New York, clerk's office for Frontier Forge & Heat Treat Co., 20 Whittier, Tonawanda, N. Y., by Murray A. Teza.

Nelco Tool Doubles Capacity

Concurrent with its tenth anniversary, Nelco Tool Co., Manchester, Conn., announced completion of its building program which more than doubles its manufacturing space. Of interest to industry is the new induction brazing room which eliminates interference to television reception caused by brazing operations. The company found an ingenious solution to the problem in the form of an electronic leak-proof room

COAL PUSHER: A Jones & Laughlin towboat, the *Vesta*, pushes 7500 tons of coal from a Monongahela river mine to the company's Aliquippa, Pa., plant. Coal delivered over Pittsburgh's three rivers adds up each year to more tonnage than is handled by either the Panama or Suez canals

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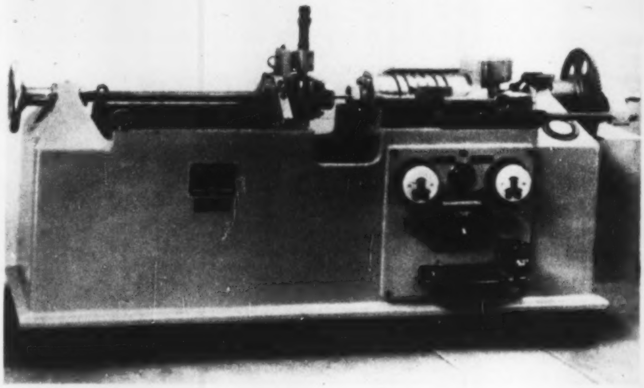

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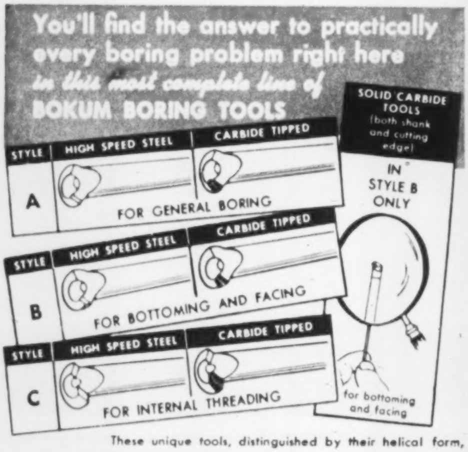

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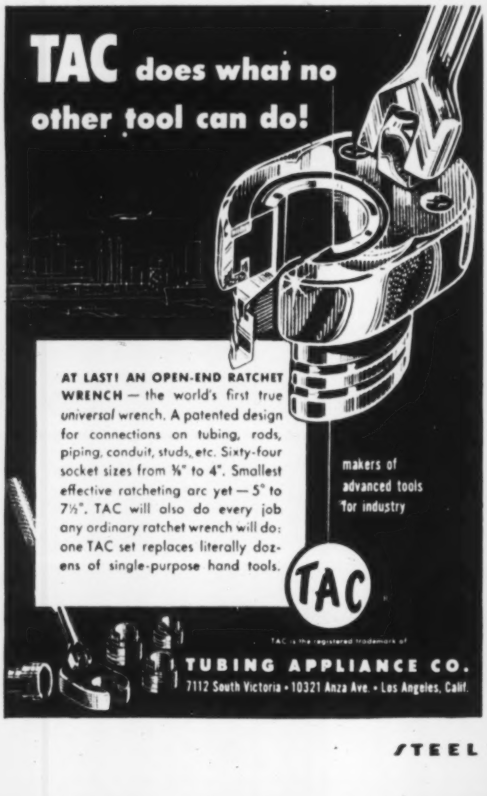

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from which no disturbance can escape. If you have a similar problem, Nelco Tool Co. will pass detailed information on to you.

Caterpillar Buys Trackson

Caterpillar Tractor Co., Peoria, Ill., acquired Trackson Co., Milwaukee. Trackson will be operated as a wholly-owned subsidiary and will continue its manufacture of loaders and pipelayers as auxiliary equipment for Caterpillar diesel tractors.

Bell Aircraft Buys Plant

Bell Aircraft Corp., Buffalo, purchased the former Linde Air Products Co. plant in that city. The plant will be used for the fabrication and subassembly of Air Force bombers. Rehabilitation of the property will begin soon. It has 67,000 square feet of floor space and raises to more than 1.8 million square feet the amount of plant space occupied by Bell in the Buffalo area.

Grayson-Greenamyer Moves

General Controls Co., Glendale, Calif., moved the Grayson-Greenamyer Appliance Controls Division from Monrovia, Calif., to a new plant in Glendale. The new facility is for the manufacture of appliance controls for gas ranges, water heaters, room heaters and other appliance specialties.

Flett Opens Office on Coast

James Flett Organization Inc., national industrial scrap sales and service agency, New York, opened a West Coast office at 3440 Wilshire Blvd., Los Angeles, Calif. David Bopp was appointed West Coast manager.

Steel Assured for Foundry

Officials of Fairbanks Co., Binghamton, N. Y., have been assured the company will receive the structural steel needed for the new foundry now under construction. Foundation work on the 17,000 square foot addition is well under way. The $196,000 structure is part of a large modernization program.

Wales-Strippit Expands

Wales-Strippit Corp., North Tonawanda, N. Y., ordered about $250,000 worth of machine tools for an expansion program scheduled for completion in July, says Walter P. Hooper, president. The company also is planning to acquire additional plant space in the near future. A part-time four-hour shift and a second eight-hour shift have been added to boost production of machine tools.

LABOR SAVER: A new type cotton seed piler, erected by the Consolidated Western Steel Corp., at the Phoenix, Ariz., plant of Producers Cotton Oil Co., is the first of its kind. The new machine piles seed 50 feet high on both sides of its track by means of conveyor belt systems

V & O Press Appoints Agent

V & O Press Co., division of Emhart Mfg. Co., Hudson, N. Y., appointed Bryant Machinery & Engineering Co., Chicago, as representative for its line of precision power presses, roll feeds and feed-o-matics in the Chicago territory.

Davie Gets Tanker Contract

Davie Shipbuilding & Repair Co., Lauzon, Que., was awarded a contract for construction of one of the world's biggest tankers and the largest ever built in Canada. It will be a 28,000 ton vessel.

Machine & Tool Firm Formed

A business name was filed in the Erie county, New York, clerk's office for Herpin & Evans Machine & Tool Co., 916 Genesee St., Buffalo, by Guenther H. Herpin and William Evans.

Meters Firm Makes Changes

Republic Flow Meters Co., Chicago, opened a branch office at 2426 W. Holcombe Blvd., Houston, under the managership of George H. Woodward. Other recent additions to Republic's field engineering staff include: New factory branch office at 1002 Second Ave., Seattle, under the district managership of Henry Weber; St. Louis district office was moved to 13 S. Meramec St., Clayton, Mo., where William G. Baker is in charge; Phil-

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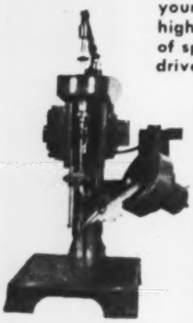

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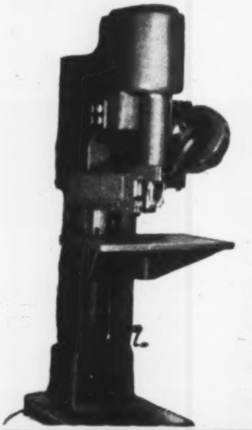

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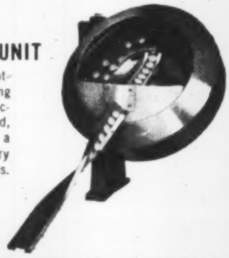

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adelphia district office was expanded and relocated at 308 Suburban Square Bldg., Ardmore, Pa., with Louis C. Walter continuing as district manager; Syracuse branch office, 317 State Tower Bldg., with William J. Angus as district engineer; Buffalo branch office, Prudential Bldg., is in charge of Charles T. Duffy.

Builds Aircraft Galleys

Nordskog Mfg. Co., Van Nuys, Calif., started to manufacture aircraft galleys at 15917 Strathern St. Robert A. Nordskog is owner.

Cerium Metals To Expand

Cerium Metals Corp., New York, received a $160,000 rapid tax write-off certificate for expansion of its plant facilities in Niagara Falls, N. Y. from the Defense Production Administration.

Wisener-Rapp Leases Space

Wisener-Rapp Co. Inc., Buffalo, rented 18,000 square feet of space in R. H. Thompson Co.'s plant at 717 Elk St., that city. The space will be used for office, storage and engineering operations and possibly light manufacturing. Wisener-Rapp Co. has a $7 million order backlog, 90 per cent of which is for machine tools.

Cornell Contracts Soar

Cornell Aeronautical Laboratory, Buffalo, now is at work on research and development contracts valued at $21 million, a new high. This compares with about $12 million at the beginning of 1951. The increase in activity at the laboratory has made it necessary to put into use 28,000 square feet of added floor space.

Vancouver To Build Furnace

Vancouver Steel Co., Vancouver, B. C., disclosed plans for a $2.5 million electric furnace as the first unit of a steel industry based on British Columbia iron ore. Plans call for a 100-ton-a-day electrical unit for the heating of magnetite ore. However, the unit will not be built immediately, but will wait development of expanding Canadian markets.

Farrel-Birmingham Buys Firm

Farrel - Birmingham Co. Inc., Ansonia, Conn., acquired the common stock of Consolidated Machine Tool Corp., Rochester, N. Y. The new owner will operate the Consolidated plant as its subsidiary and will continue production of its machine tool lines.

Will Build Amphibious Units

Pacific Car & Foundry Co., Renton, Wash. will build an unstated number of amphibious vehicles for the Navy at its recently reactivated Everett, Wash., plant. Operations await allotment of tools and materials. Present labor crew of 85 will be increased to 400. The former Pacific Shipbuilding & Dry Dock plant was reopened Nov. 1 under a Navy lease.

COLD LOGIC: Technicians at General Electric's San Francisco Service Shop packed the 2200-lb motor shaft in a box of dry ice over night. Result: Next morning they were able to work the shaft back into its snug-fitting armature with ease. At room temperature, the shaft expanded some six thousandths of an inch, assuring a tight fit between the two parts. The armature assembly is part of a motor for an elevator in the San Francisco Stock Exchange Building

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to Shear		
Plates	7/16"	1/2"
Flat Bars	3" x 9/16"	3-3/16" x 5/8"
Tees	3-1/8" x 5/16"	4" x 3/8"
Angles	3-1/8" x 5/16"	4" x 3/8"
Round Bars	1-3/16"	1-3/8"
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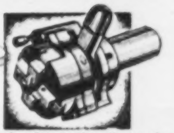

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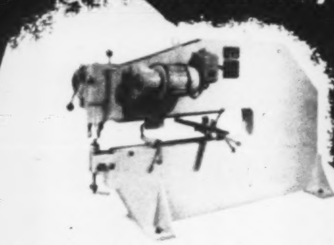

Straight cutting, circle cutting, free hand cutting, slot cutting, beading, folding and many variations of these operations . . . *ALL ON ONE PIECE OF MACHINERY!* Easy to set up and change tools . . . handles wide range of materials such as mild or stainless steels, non-ferrous metals, mesh, plastic sheets, composition boards of all kinds. Write for descriptive catalog showing performance and data on all models.

ALL THESE OPERATIONS ON ONE MACHINE

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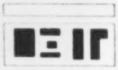
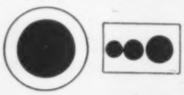


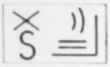
With straight cutting attachment, Pullmax performs as a straight shear. Cuts inside square holes. Can be used as a guide for other operations.

CIRCLE CUTTING

The Pullmax machine does not require a center hole for circle cutting. Simple, adjustable centering attachments cut circles quickly and accurately.



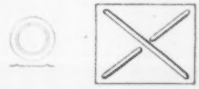
SLOT CUTTING



Slot cutting tools permit almost any slotting operation. Top tool in various sizes, lower tool adjustable.

BEADING

Special beading tools permit straight, circular and irregular beads. Tools for special beads can be made in any tool room.



FOLDING

Standard size folding tools do straight, circular or irregular shape folds. Special tools easily made in any tool room.

LOUVERS and NIBBLING

Special attachments permit louver cutting and nibbling.

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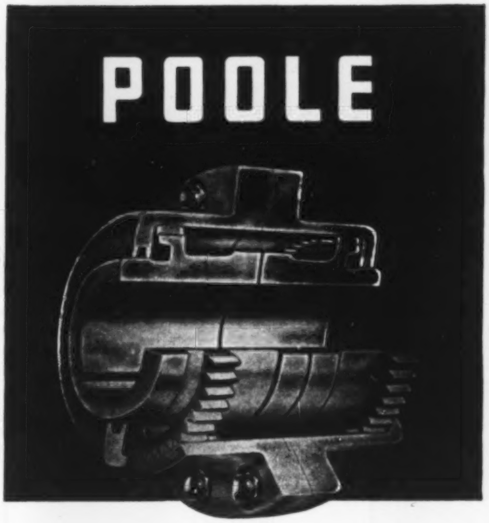

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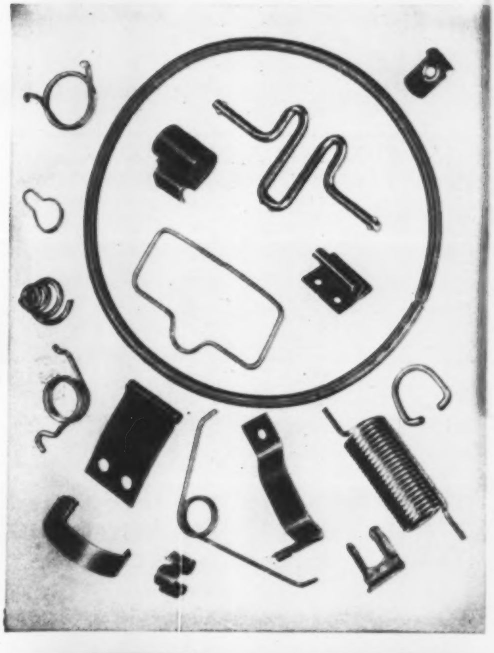

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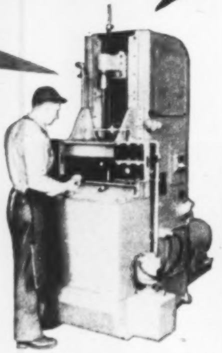

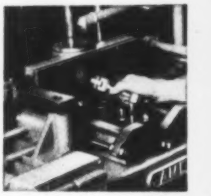

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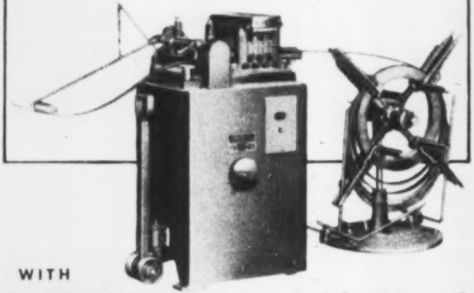

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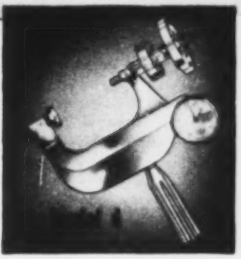

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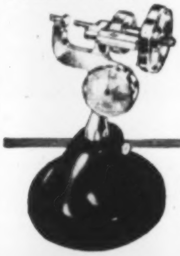
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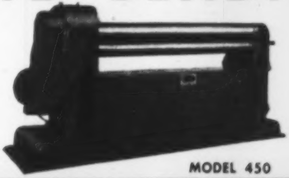
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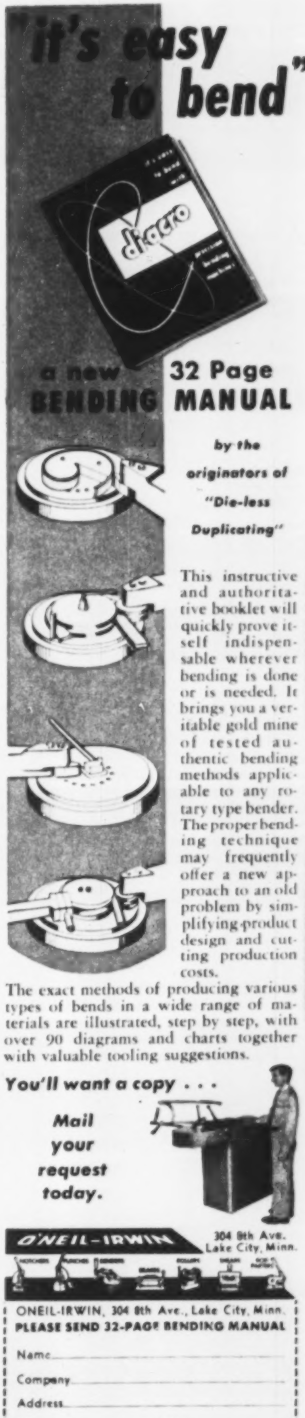

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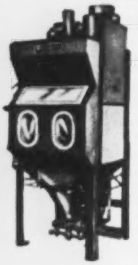

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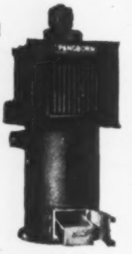

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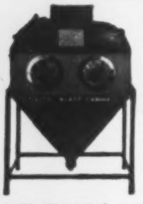

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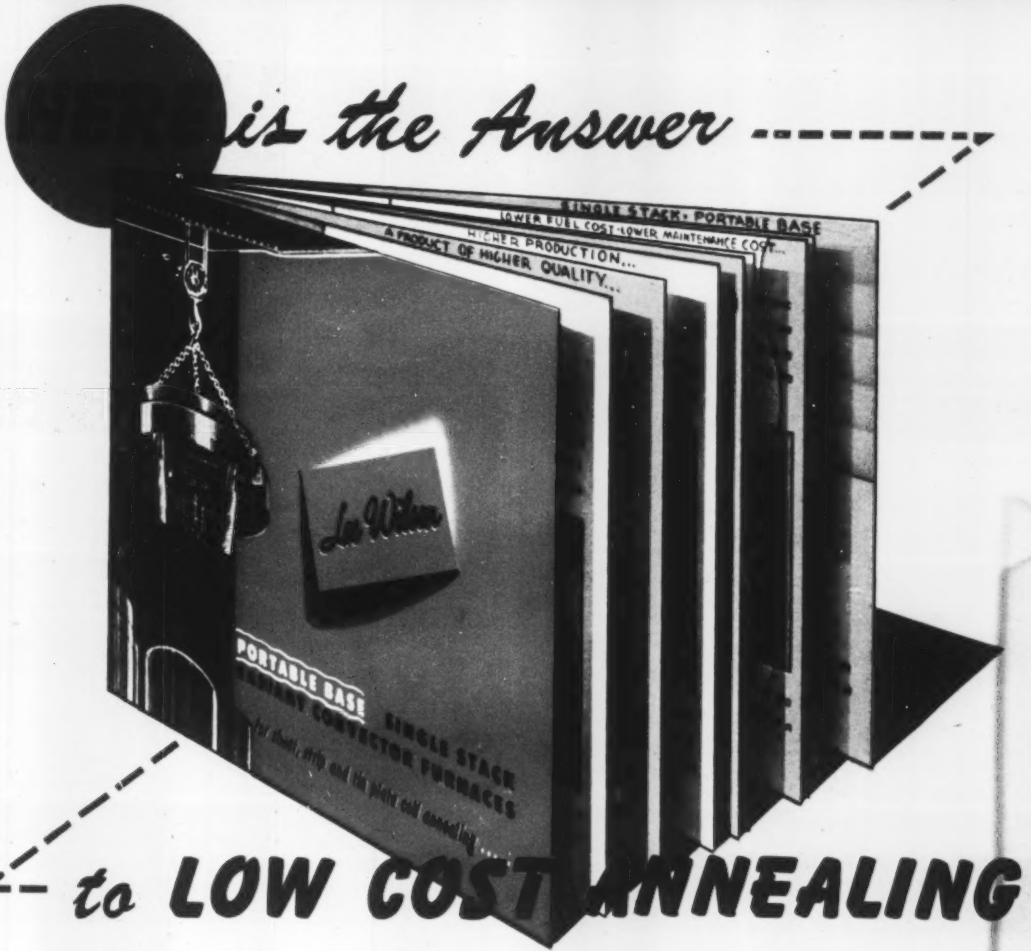
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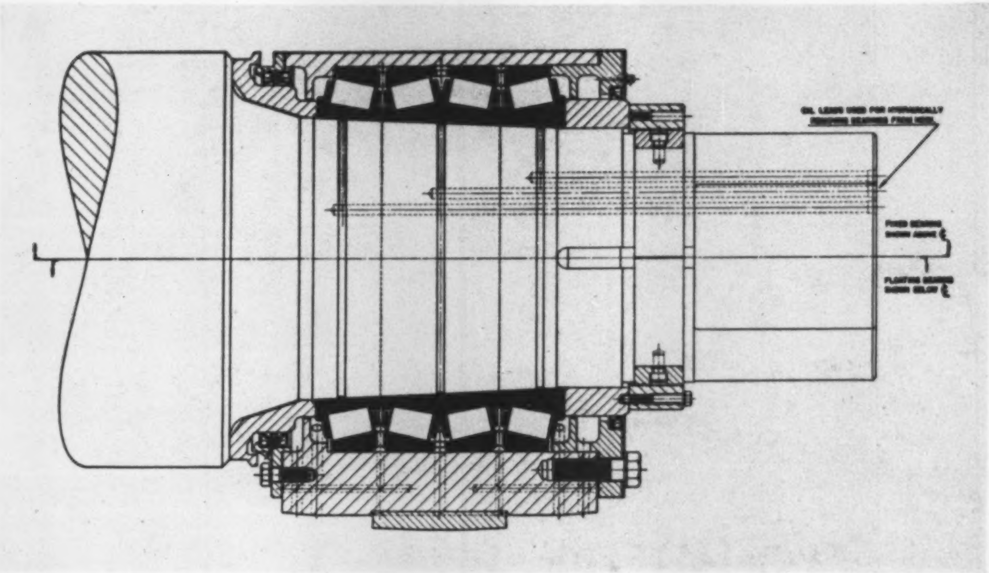

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